Itron, Inc.

TEST REPORT FOR

AMR Transceiver Device For Communicating With Utility Meters
Models: IMRD-INT and IMRD-EXT

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(FHSS 902-928 MHz)

Report No.: 105444-4

Date of issue: August 31, 2021

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Test Certificate # 803.01

Testing the Future
CKC LABORATORIES, INC.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Itron, Inc.
2111 N. Molter Road
Liberty Lake WA 99019

Representative: Jay Holcomb
Customer Reference Number: 238223

REPORT PREPARED BY:

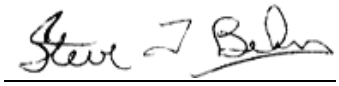
Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 105444

DATE OF EQUIPMENT RECEIPT: June 21, 2021
DATE(S) OF TESTING: June 21-30, 2021 and July 1-20, 2021

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E.,
Canyon Park, Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.19

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Canada	Japan
Canyon Park, Bothell, WA	US0103	US1024	3082C	A-0136
Brea, CA	US0103	US1024	3082D	A-0136
Fremont, CA	US0103	US1024	3082B	A-0136
Mariposa, CA	US0103	US1024	3082A	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(i)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(i)	Average Time of Occupancy	NA	Pass
15.247(b)(2)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-INT	105444-int cond

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA
Attached Antenna	L-comm	3dBi Rubber Duck	NA
TNC to RMA Adapter	Molex	73386-1250	NA

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA
Ground Plane	Itron, Inc.	4ft	NA
Vehicle Antenna	PCTEL	5dBi Vehicle Mount	NA

Configuration 7

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-INT	105444-int rad

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA

Configuration 9

Equipment Tested9

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-INT	105444-int rad

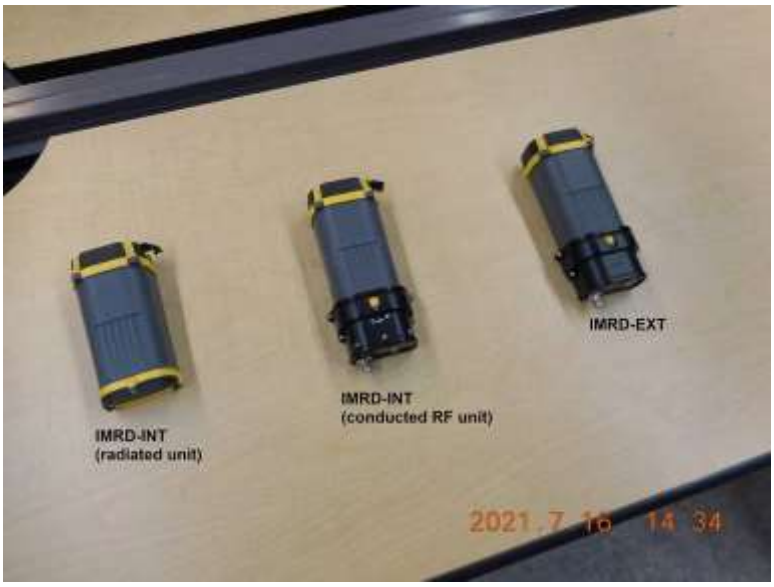
Support Equipment:

Device	Manufacturer	Model #	S/N
AC-USB Adapter	ELJINTEK. INC	GUSB05	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	Proprietary FHSS
Operating Frequency Range:	908-924MHz
Number of Hopping Channels:	81
Receiver Bandwidth and Synchronization:	The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter.
Modulation Type(s):	FSK
Maximum Duty Cycle:	Tested 100% as worst case
Number of TX Chains:	1
Antenna Type(s) and Gain:	Internal PIFA 1.2 dBi External Omni Vehicle 5 dBi External Omni Attached 3dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral and External variant
Nominal Input Voltage:	120VAC 60Hz to AC Adapter on Internal Unit 13.8V DC on External Unit
Firmware / Software used for Test:	DSP Version 7.00.00.26 / FPGA Version 3.08 / MC3 Test v 4.0.3.5 DSP Version 7.00.00.34 / MC3 Test v 4.1.0.0 for Hopping Tests

EUT Photo(s)

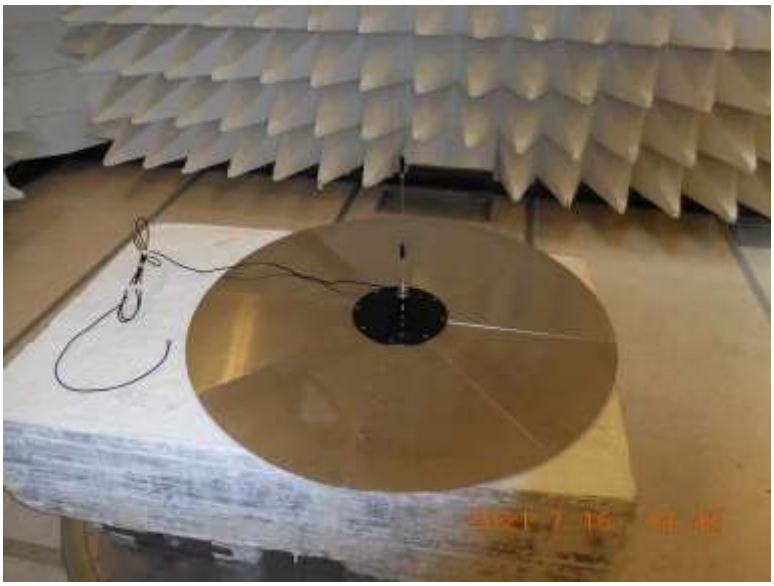


Support Equipment Photo(s)

AC-USB Adapter

Attached Antenna with adapter

DC Power Supply

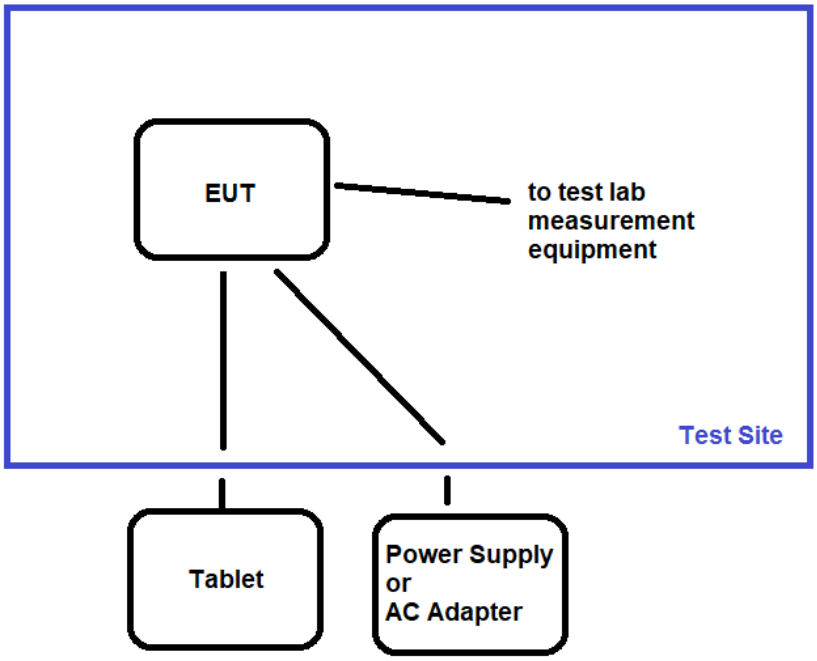


External Antenna + Ground Plane

Tablet

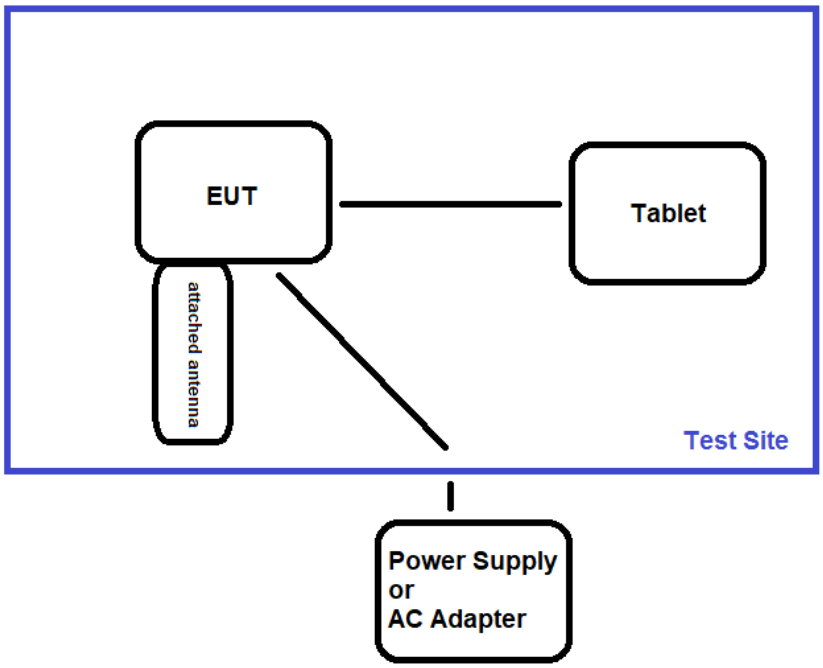
Block Diagram of Test Setup(s)

Test Setup Block Diagram



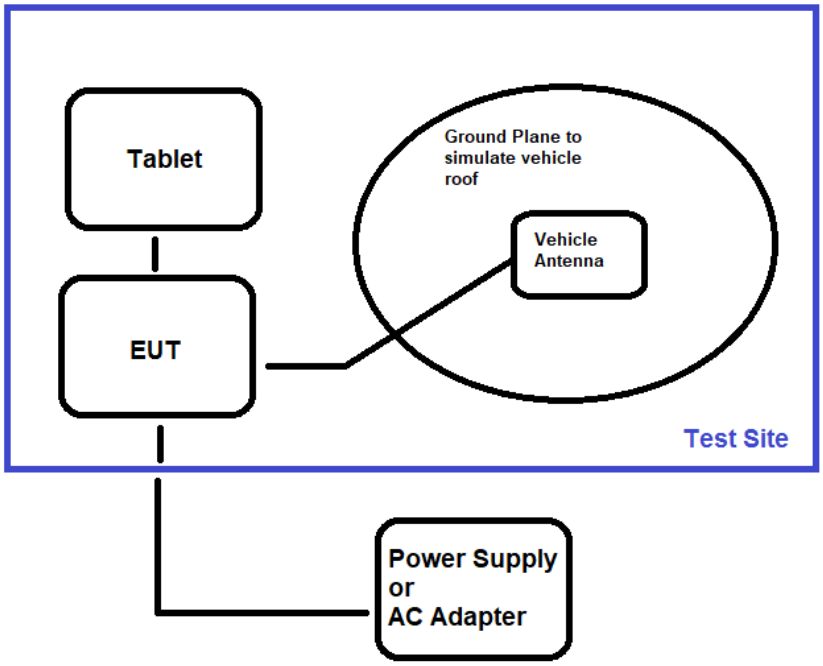
Configuration 1 and 2

Test Setup Block Diagram



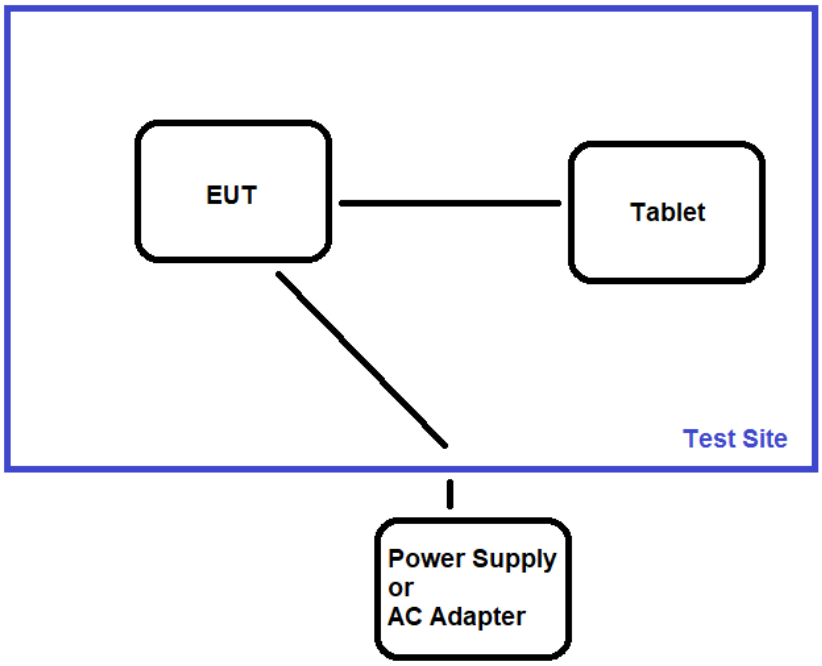
Configuration 3

Test Setup Block Diagram



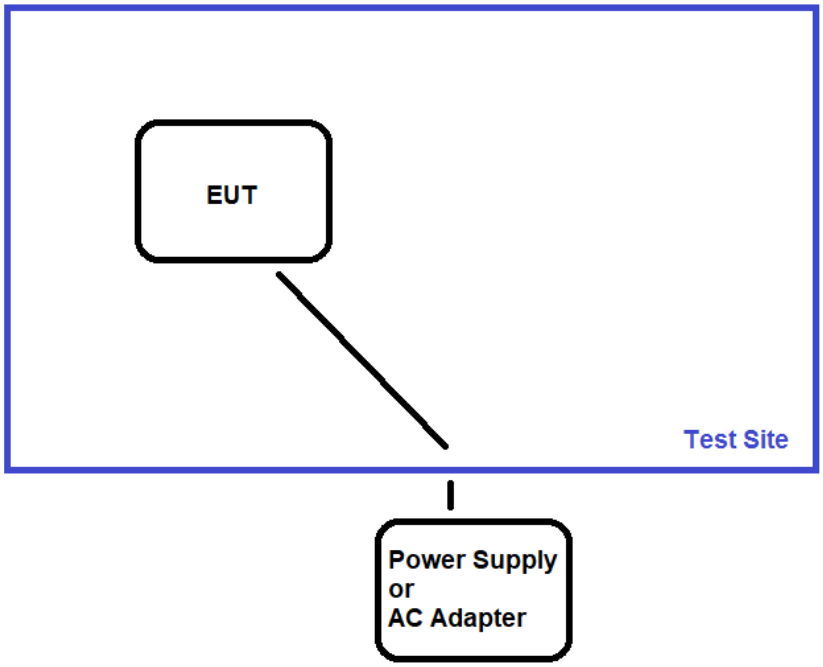
Configuration 5

Test Setup Block Diagram



Configuration 7

Test Setup Block Diagram



Configuration 9

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Atkinson/M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/21/2021 to 7/20/2021
Configuration:	1		
Test Setup:	EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is set to transmit from test software on support tablet.		

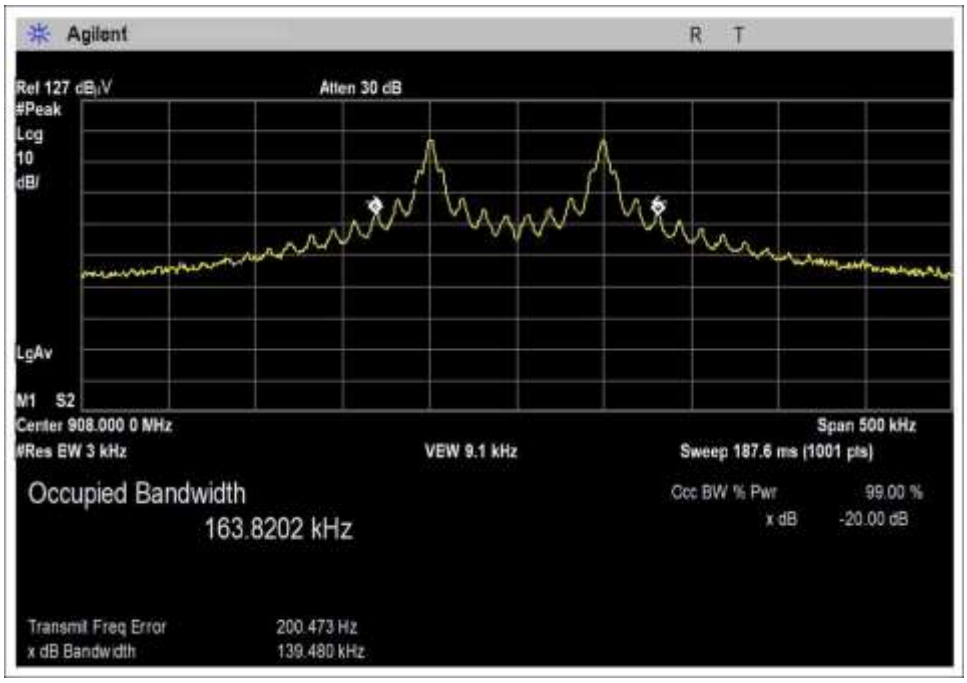
Environmental Conditions			
Temperature (ºC)	22-24	Relative Humidity (%):	40-50

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02871	Spectrum Analyzer	Agilent	E4440A	3/12/2020	3/12/2022
P07670	Attenuator	Pasternack	PE7389-20	8/20/2020	8/20/2022
P06454	Cable	Andrews	Heliax	1/20/2020	1/20/2022

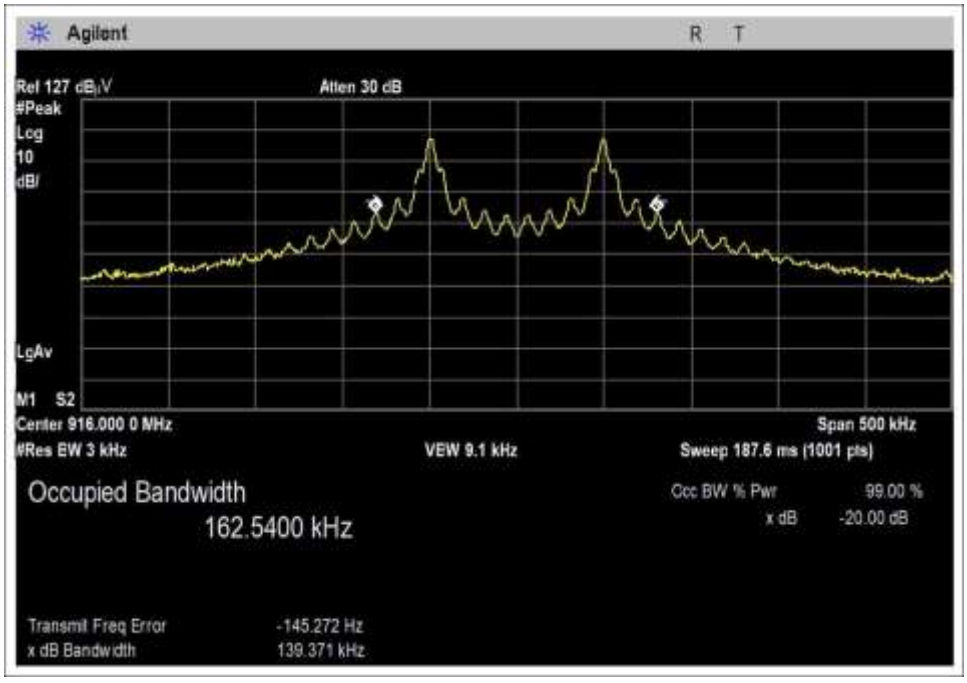
15.247(a)(1) 20 dB Bandwidth

Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
908	1	FSK	139.480	≤500	Pass
916	1	FSK	139.371	≤500	Pass
924	1	FSK	139.916	≤500	Pass

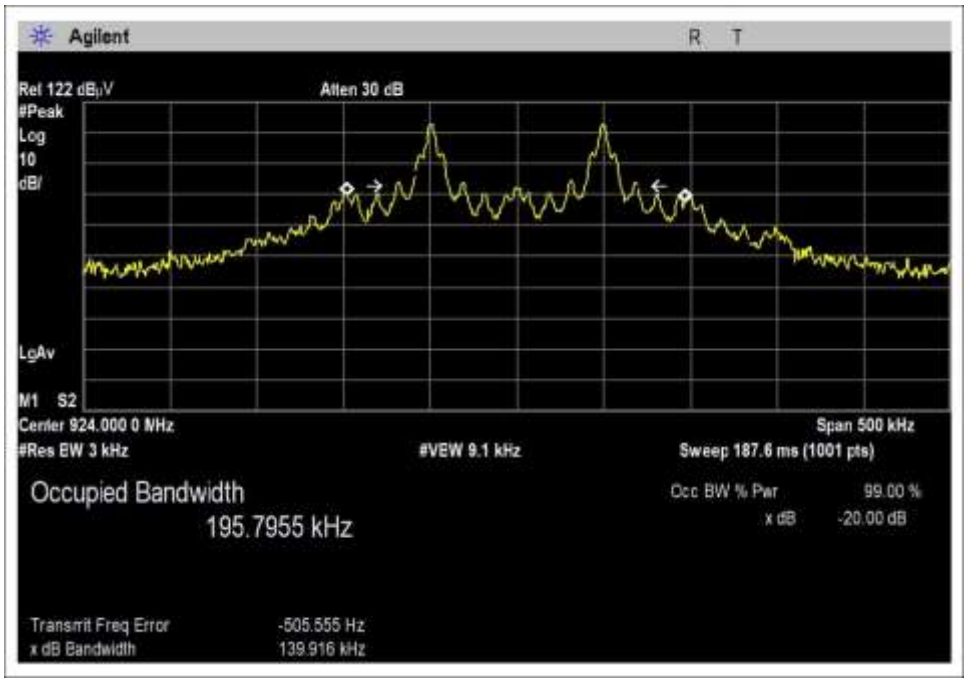
Plot(s)



Low Channel



Middle Channel

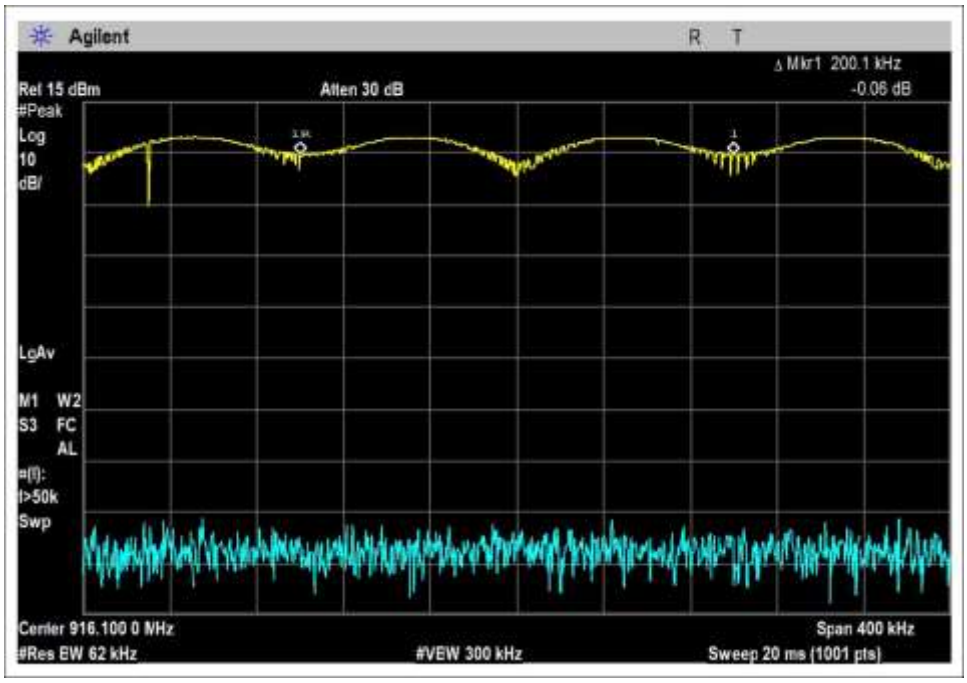


High Channel

15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	FSK Hopping	200.1	>139.916	Pass

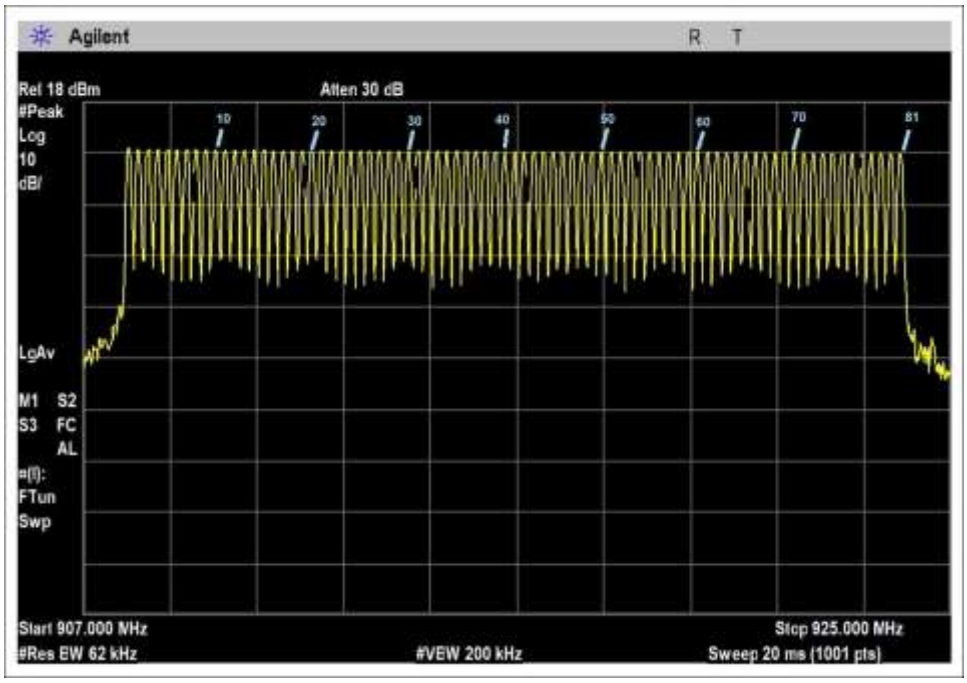
Plot(s)



15.247(a)(1)(i) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
1	Hopping (CW Test Mode)	81	≥50	Pass

Plot(s)



15.247(a)(1)(i) Time of Occupancy

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = \begin{cases} 20\ Seconds \mid 20\ dB\ BW < 250kHz \\ 10\ Seconds \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
1	Hopping with modulation	358.4	≤400	Pass

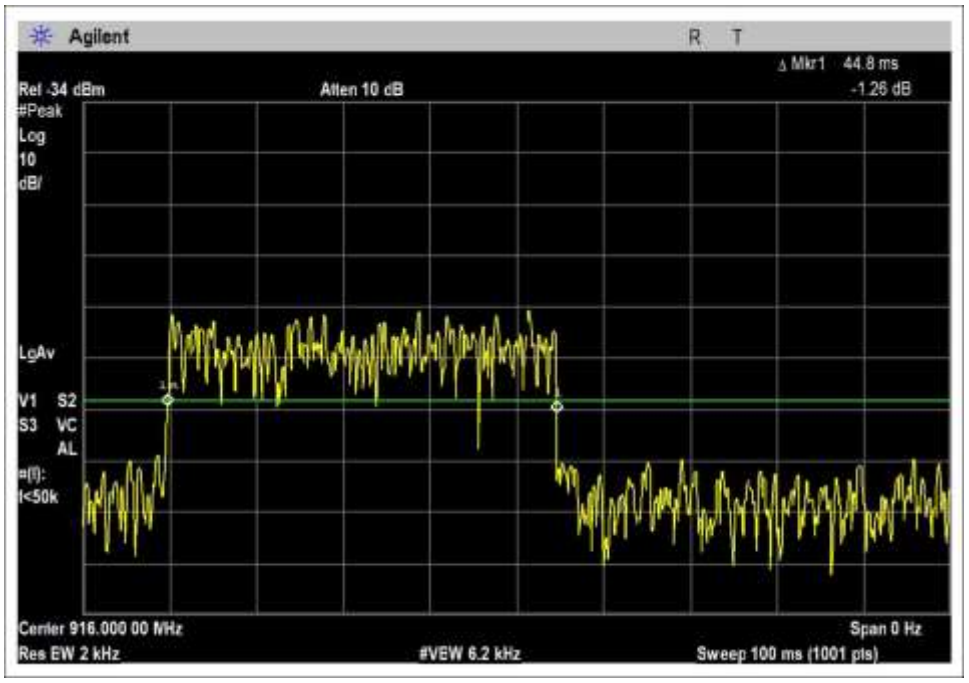
Measured results are calculated as follows:

$$Dwell\ time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Big|_{P_{obs}}$$

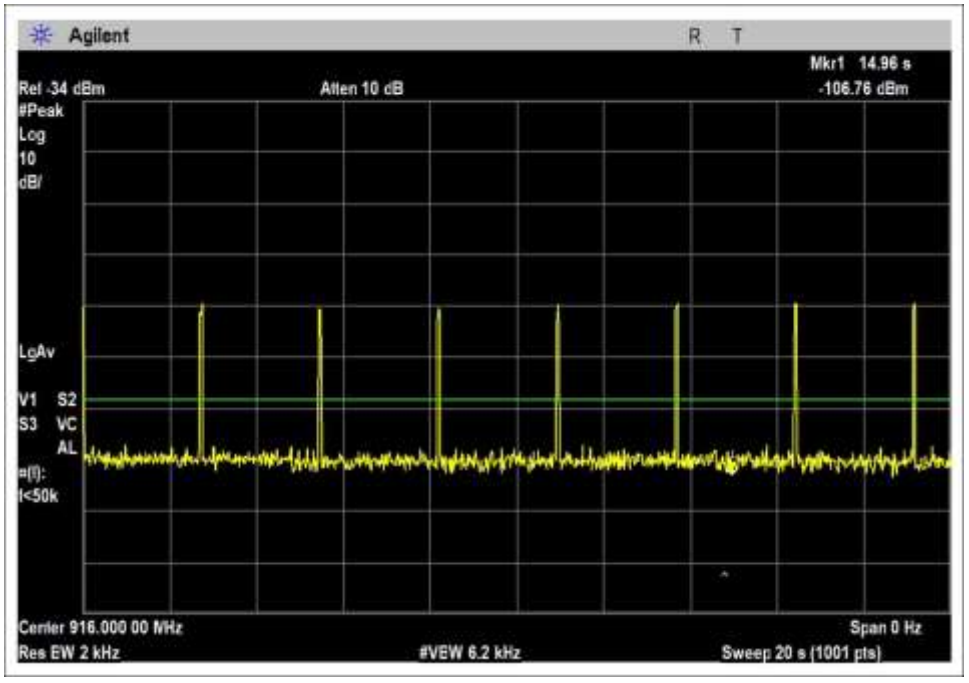
Actual Calculated Values:

Parameter	Value
Observation Period (P_{obs}):	20 sec
Number of RF Bursts / P_{obs}:	8
On time of RF Burst:	44.8 msec
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	358.4 msec

Plot(s)



Worst Case Single Burst 44.8ms



8 Bursts every 20 seconds

Test Setup Photo(s)

15.247(b)(2) Output Power

Test Data Summary - Voltage Variations – Configuration 1					
Configuration 1					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
908	FSK / External Antenna Version	29.7	29.7	29.7	0.0
916	FSK / External Antenna Version	29.4	29.4	29.4	0.0
928	FSK / External Antenna Version	29.2	29.2	29.2	0.0

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions (External Antenna Version):

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	13.8VDC
$V_{Minimum}$:	11.7VDC
$V_{Maximum}$:	15.9VDC

Test Data Summary - RF Conducted Measurement – Configuration 1					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$					
Frequency (MHz)	**Modulation / Ant Port**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
908	FSK / External Antenna Version	Max External 5dBi	29.7	≤ 30	Pass
916	FSK / External Antenna Version	Max External 5dBi	29.4	≤ 30	Pass
928	FSK / External Antenna Version	Max External 5dBi	29.2	≤ 30	Pass

Test performed using operational mode with the highest output power, representing worst case.

Test Data Summary - Voltage Variations – Configuration 2					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
908	FSK / Internal Antenna Version	29.98	29.98	29.98	0.0
916	FSK / Internal Antenna Version	29.88	29.88	29.88	0.0
928	FSK / Internal Antenna Version	29.88	29.88	29.88	0.0

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions (Internal Antenna Version):

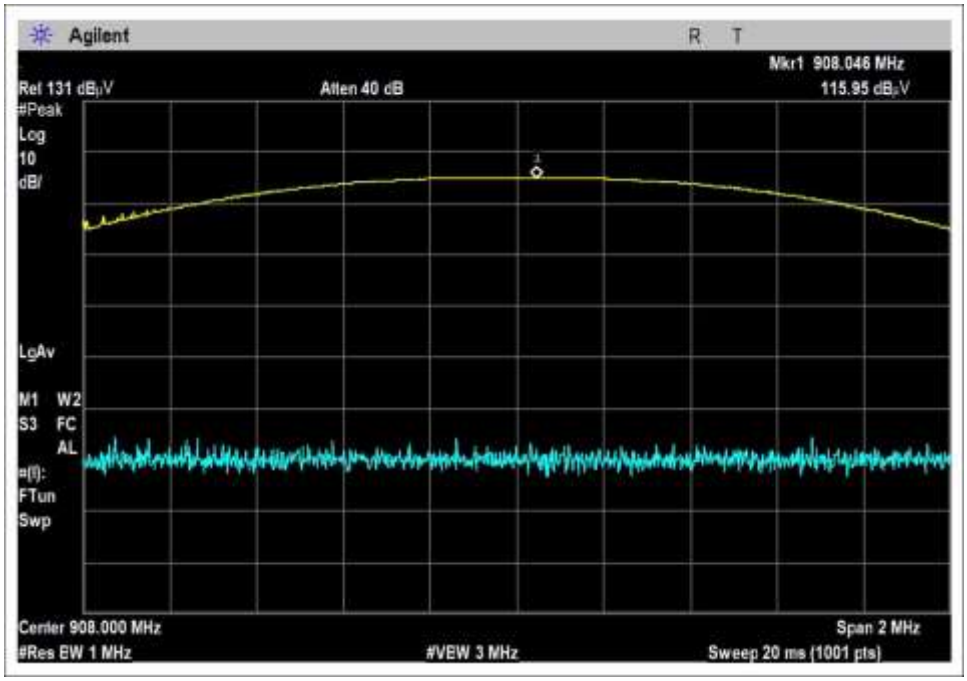
Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	120 VAC
$V_{Minimum}$:	102.00 VAC
$V_{Maximum}$:	138.00 VAC

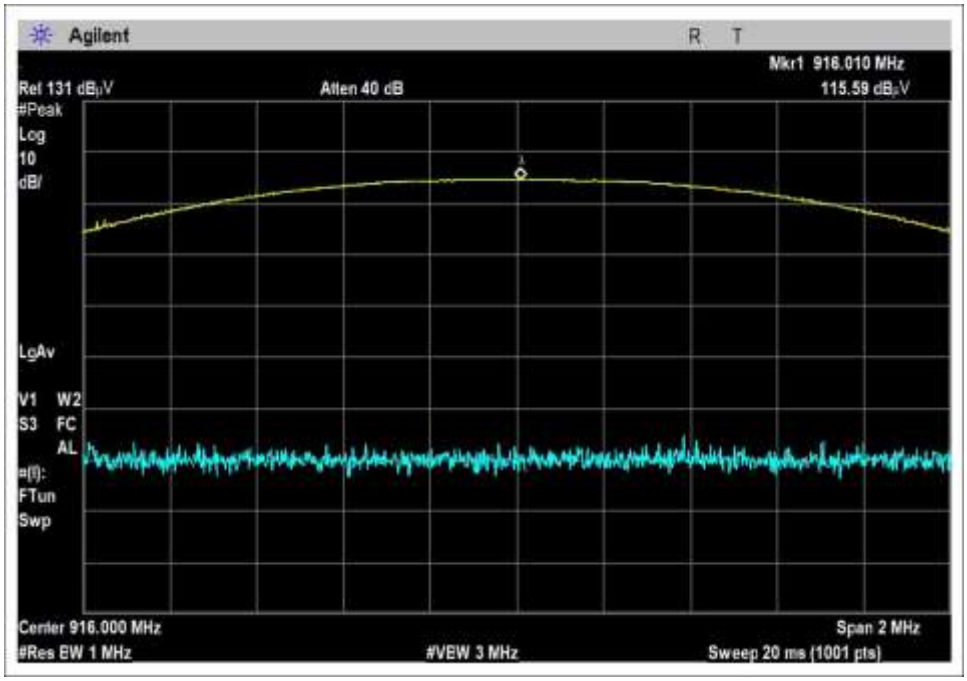
Test Data Summary - RF Conducted Measurement – Configuration 2					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$					
Frequency (MHz)	**Modulation / Ant Port**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
908	FSK / Internal Antenna Version	Internal 1.2	29.98	≤ 30	Pass
916	FSK / Internal Antenna Version	Internal 1.2	29.88	≤ 30	Pass
928	FSK / Internal Antenna Version	Internal 1.2	29.88	≤ 30	Pass

Plot(s)

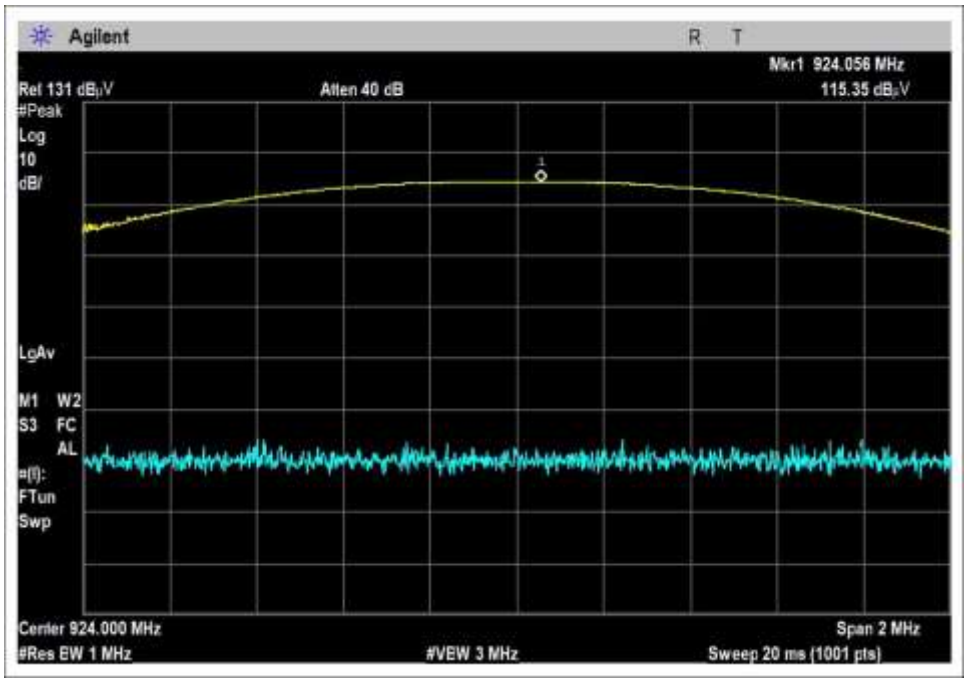
Configuration 1



Low Channel

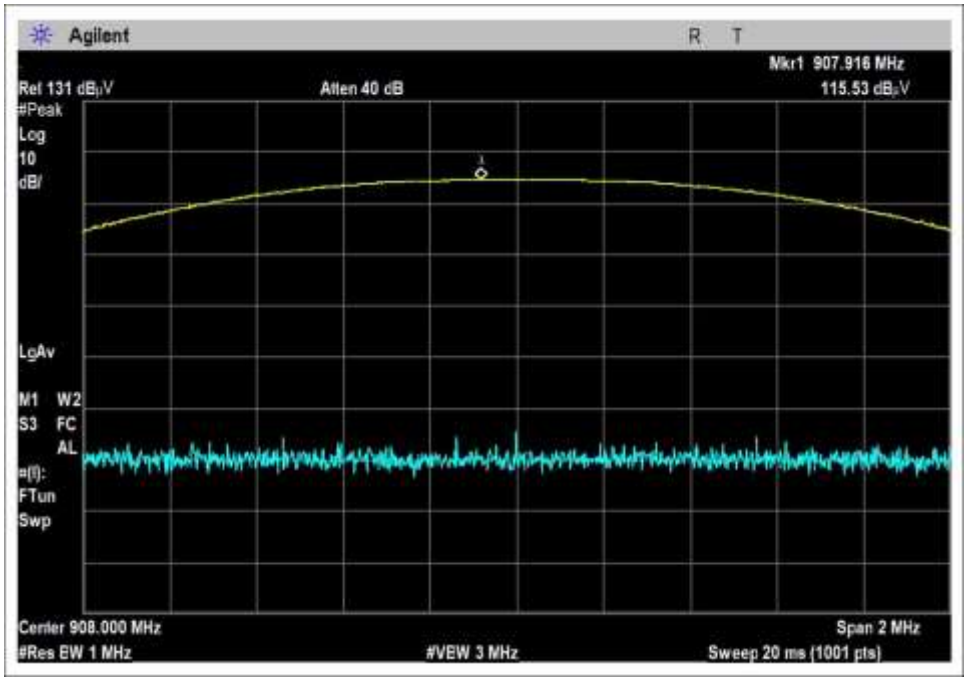


Middle Channel

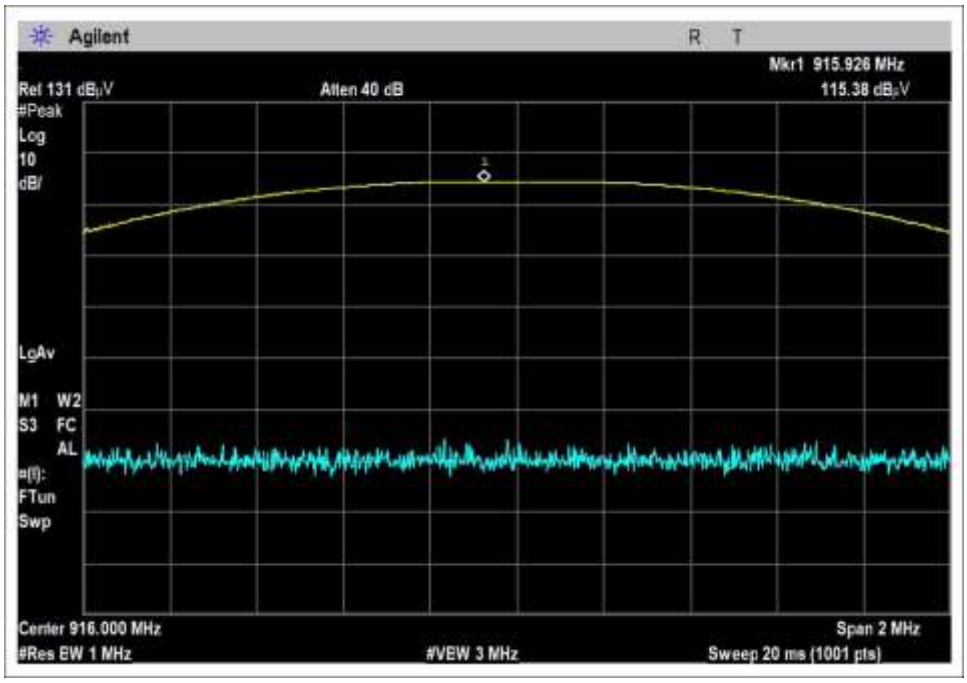


High Channel

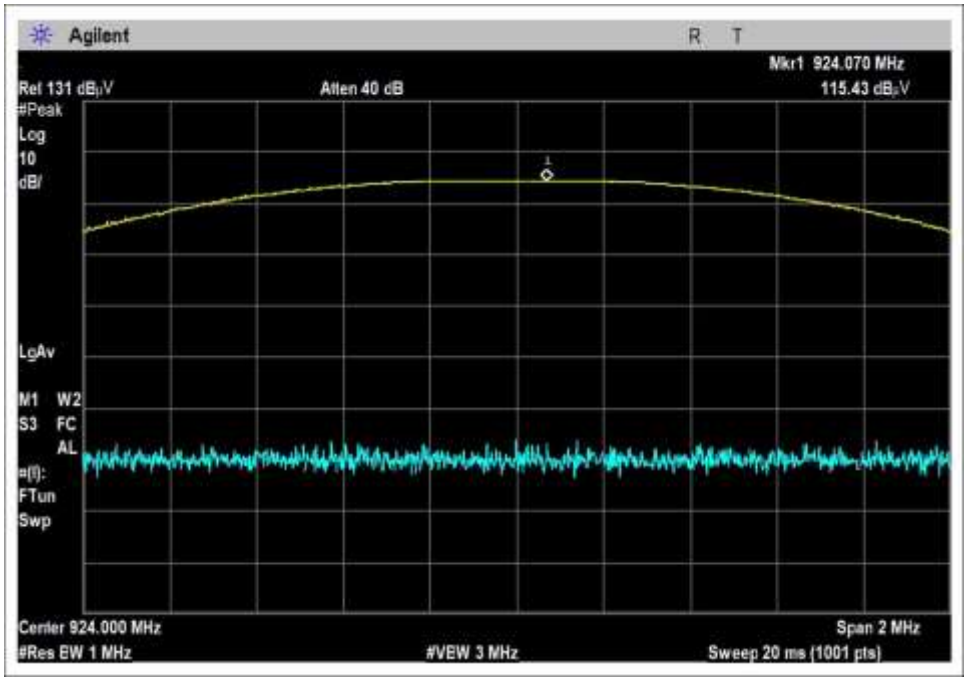
Configuration 2



Low Channel
Plot shows 115.53 dBµV, however this was recorded during the first transmitter turn on state.
Repeated measurements were taken and the final value used did not exceed 115.50 dBµV.



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**105444**	Date:	6/24/2021
Test Type:	**Conducted Emissions**	Time:	15:10:07
Tested By:	Michael Atkinson	Sequence#:	3
Software:	EMITest 5.03.19		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

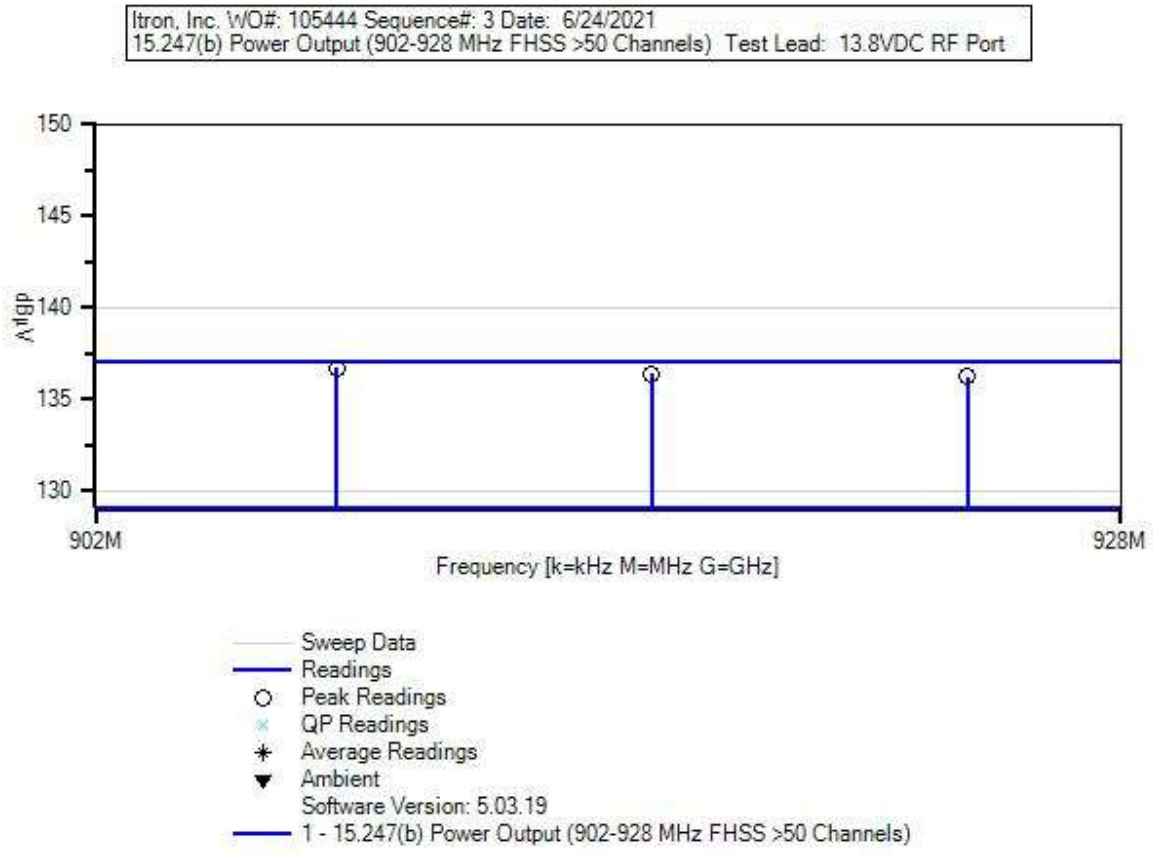
Test Conditions / Notes:

Frequency: Fundamental

External Antenna Version

EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is continuously transmitting with modulation. For the Internal Antenna version, a unit with a temporary antenna port has been provided by the manufacturer.

Test Location: Bothell Lab Bench
Test Method: ANSI C63.10 (2013)
Temperature (ºC): 24
Relative Humidity (%): 40



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07670	Attenuator		8/20/2020	8/20/2022
T2	ANP06454	Cable	Heliax	1/20/2020	1/20/2022
T3	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022

Measurement Data: Reading listed by margin. Test Lead: RF Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	908.046M	115.9	+20.1	+0.7	+0.0		+0.0	136.7	137.0	-0.3	RF Po
2	916.010M	115.6	+20.1	+0.7	+0.0		+0.0	136.4	137.0	-0.6	RF Po
3	924.056M	115.4	+20.1	+0.7	+0.0		+0.0	136.2	137.0	-0.9	RF Po

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**105444**	Date:	6/24/2021
Test Type:	**Conducted Emissions**	Time:	15:23:06
Tested By:	Michael Atkinson	Sequence#:	2
Software:	EMITest 5.03.19		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

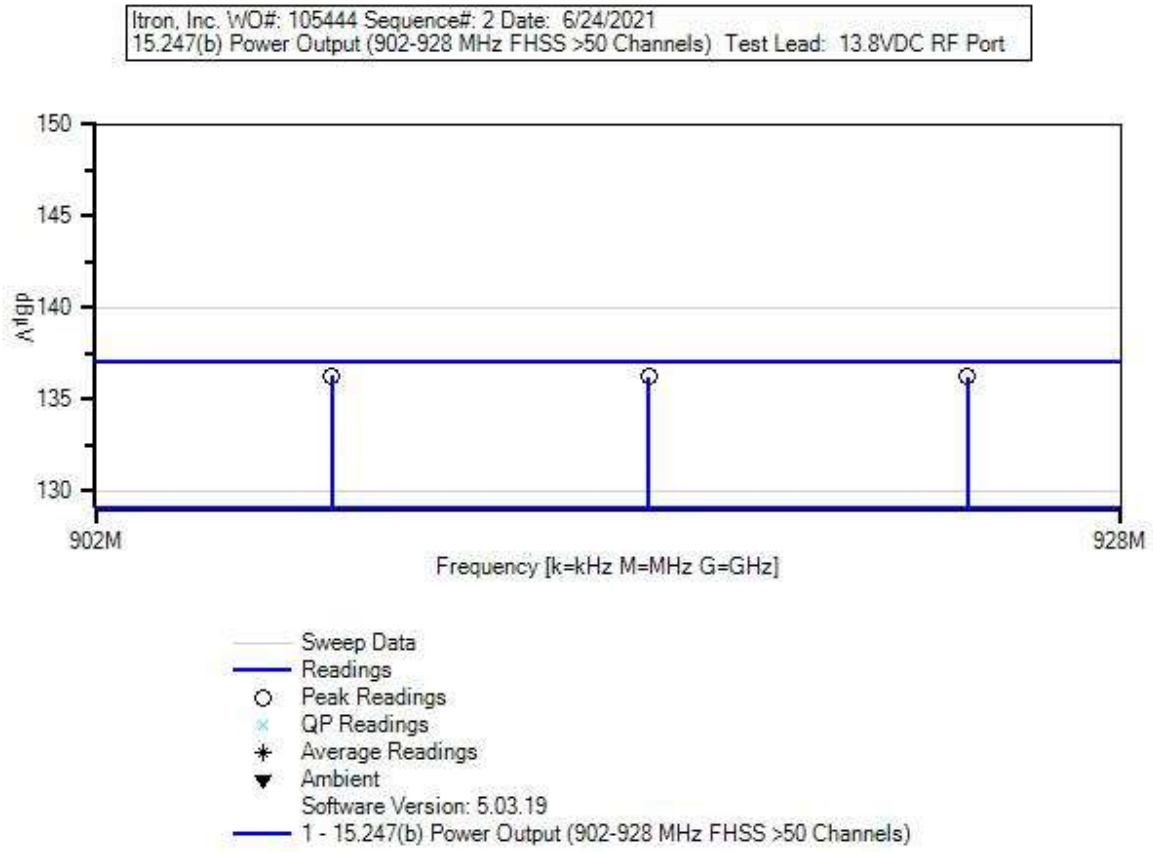
Test Conditions / Notes:

Frequency: Fundamental

Internal Antenna Version

EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is continuously transmitting with modulation. For the Internal Antenna version, a unit with a temporary antenna port has been provided by the manufacturer. The manufacturer declares there is 0.68dB of loss in the temporary port cabling, the data below will account for the 0.68dB correction.

Test Location: Bothell Lab Bench
Test Method: ANSI C63.10 (2013)
Temperature (ºC): 24
Relative Humidity (%): 40



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07670	Attenuator		8/20/2020	8/20/2022
T2	ANP06454	Cable	Heliax	1/20/2020	1/20/2022
	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
T3	ANIntCoaxISM	Test Data Adjustment		6/17/2021	6/17/2023

Measurement Data: Reading listed by margin. Test Lead: RF Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	907.916M	115.5	+20.1	+0.7	+0.7		+0.0	137.0	137.0	+0.0	RF Po
2	924.070M	115.4	+20.1	+0.7	+0.7		+0.0	136.9	137.0	-0.1	RF Po
3	915.926M	115.4	+20.1	+0.7	+0.7		+0.0	136.9	137.0	-0.1	RF Po

Test Setup Photo(s)

Configuration 1

Configuration 2

15.35(c) Duty Cycle Correction Factor

Test Data Summary			
Antenna Port	**Operational Mode**	**Measured On Time (mS / P_{obs})**	**Calculated DCCF (dB)**
1	Transmitting RF Bursts	45	-6.9

Observation Period, P_{obs} is the duration of the pulse train or maximum 100mS
Measured results are calculated as follows:

$$On\ Time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Bigg|_{P_{obs}\ (\max 100ms)}$$

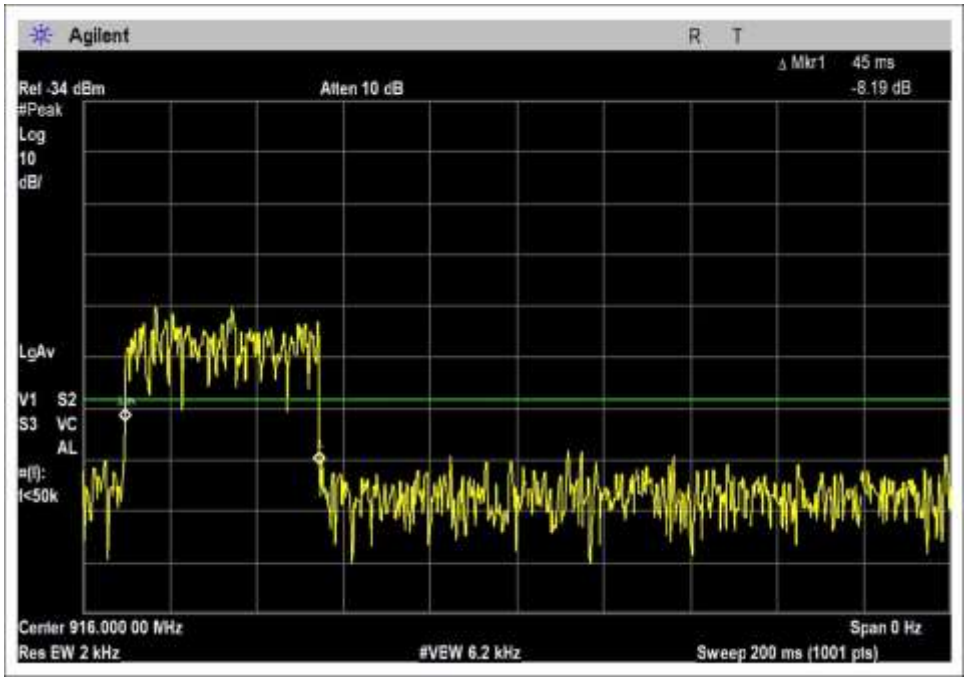
Measured Values:

Parameter	Value
Observation Period (P_{obs}):	100ms
Number of RF Bursts / P_{obs}:	1
On time of RF Burst:	45ms
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	45ms

Duty Cycle Correction Factor (DCCF) is calculated in accordance with ANSI C63.10:

$$DCCF = 20 \cdot Log\left(\frac{On\ Time}{P_{obs}}\right)$$

Duty Cycle Correction Factor Test Data



45 Percent DCCF

Test Setup Photo(s)

15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**105444**	Date:	7/2/2021
Test Type:	**Conducted Emissions**	Time:	08:46:17
Tested By:	Matt Harrison	Sequence#:	4
Software:	EMITest 5.03.19		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

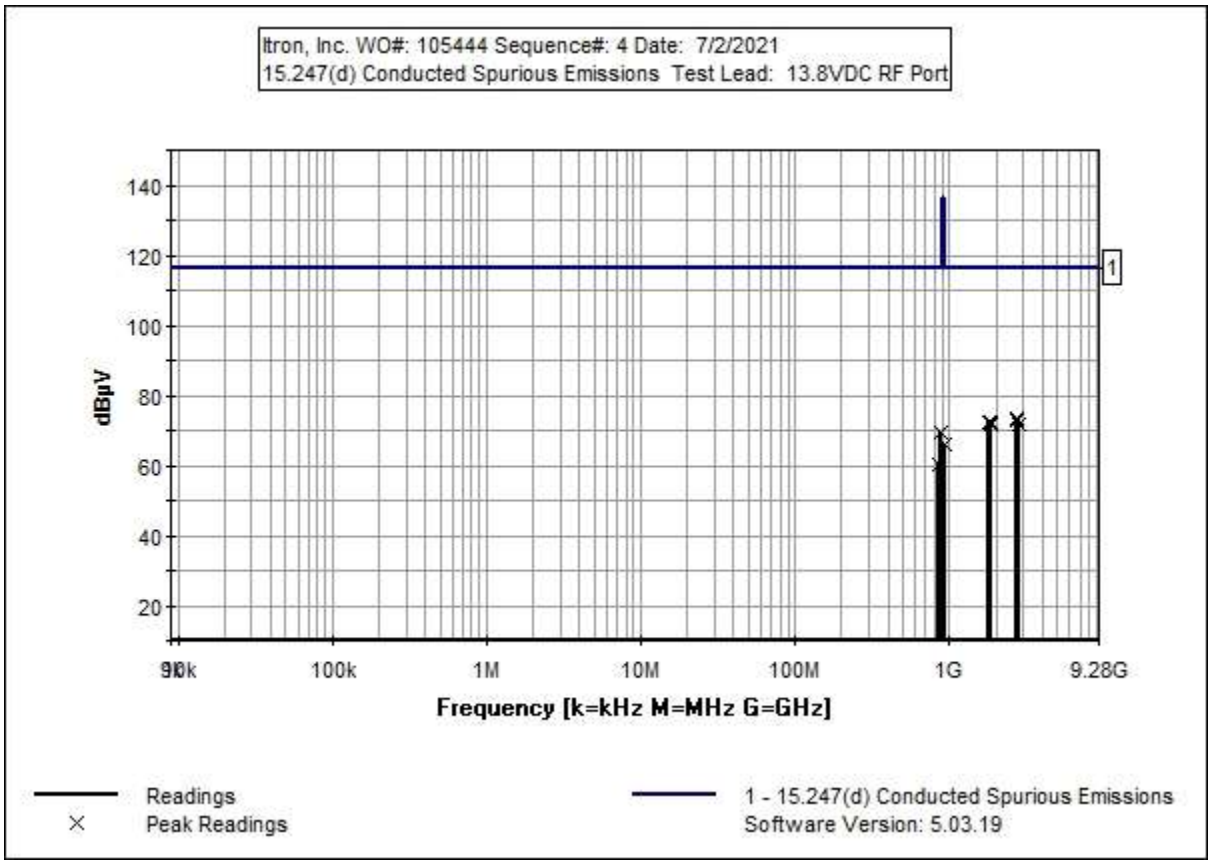
Test Conditions / Notes:

Frequency: 9kHz to 10GHz

Setup: EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is transmitting with modulation.

No emissions observed above 3GHz

Test Location: Bothell Lab Bench
Temperature (ºC): 23
Relative Humidity (%): 44
Test Method: ANSI C63.10 (2013)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07670	Attenuator		8/20/2020	8/20/2022
T2	ANP06454	Cable	Heliax	1/20/2020	1/20/2022
	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
	ANP07638	Attenuator	47-20-34	6/19/2020	6/19/2022

Measurement Data: Reading listed by margin. Test Lead: RF Port

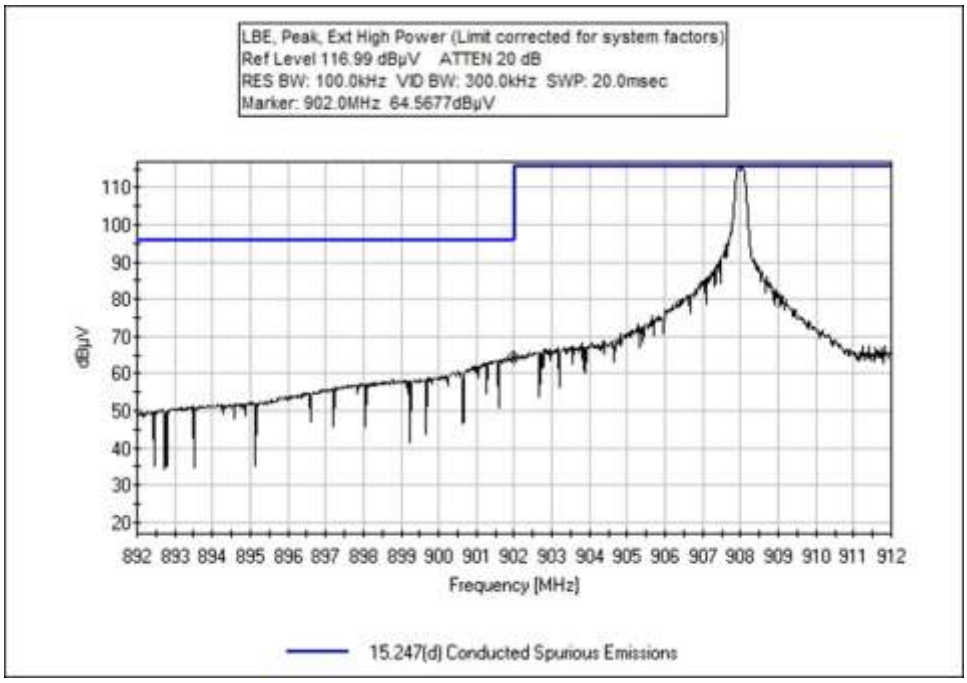
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2723.820M	52.2	+20.1	+1.3			+0.0	73.6	116.4	-42.8	RF Po
2	2747.790M	51.6	+20.1	+1.3			+0.0	73.0	116.4	-43.4	RF Po
3	1815.645M	51.3	+20.1	+1.1			+0.0	72.5	116.4	-43.9	RF Po
4	1832.250M	50.9	+20.1	+1.1			+0.0	72.1	116.4	-44.3	RF Po
5	2772.100M	50.3	+20.1	+1.4			+0.0	71.8	116.4	-44.6	RF Po
6	1848.027M	50.3	+20.1	+1.1			+0.0	71.5	116.4	-44.9	RF Po
7	884.232M	48.4	+20.1	+0.7			+0.0	69.2	116.4	-47.2	RF Po
8	932.136M	45.2	+20.1	+0.7			+0.0	66.0	116.4	-50.4	RF Po
9	860.280M	39.5	+20.1	+0.7			+0.0	60.3	116.4	-56.1	RF Po

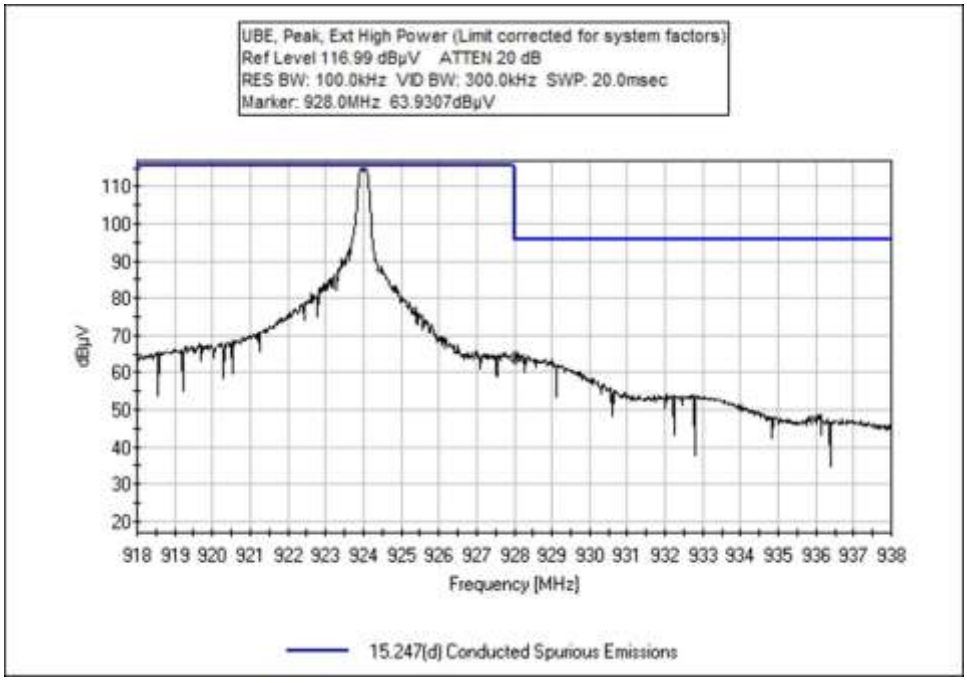
Band Edge

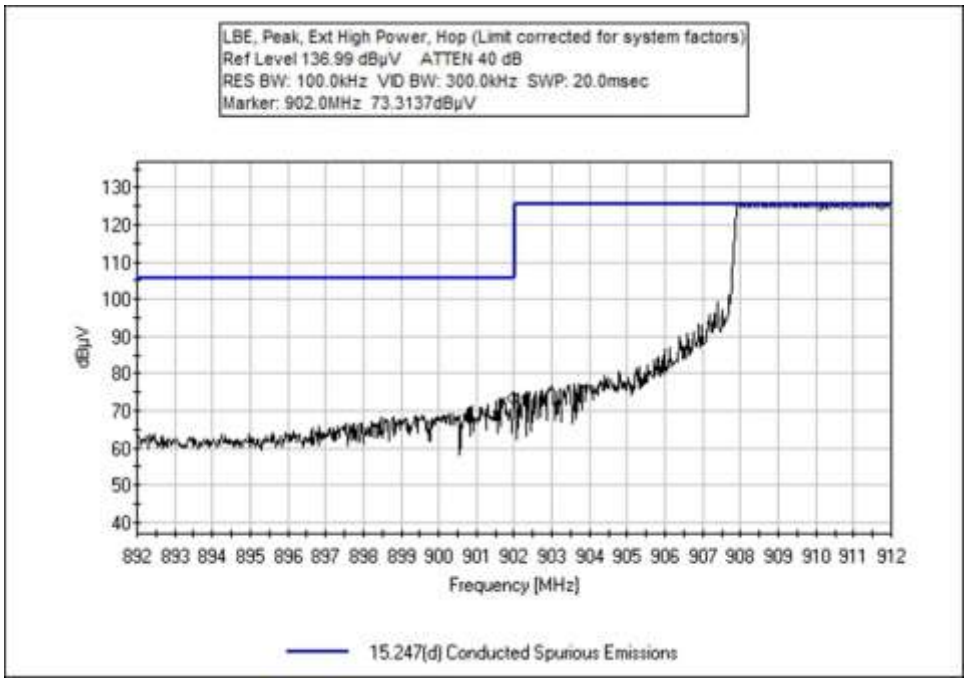
Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Single Channel (Low and High)				
Frequency (MHz)	**Modulation**	**Measured (dBuV)**	**Limit (dBuV)**	**Results**
902	FSK	85.4	< 116.4	Pass
928	FSK	84.7	< 116.4	Pass

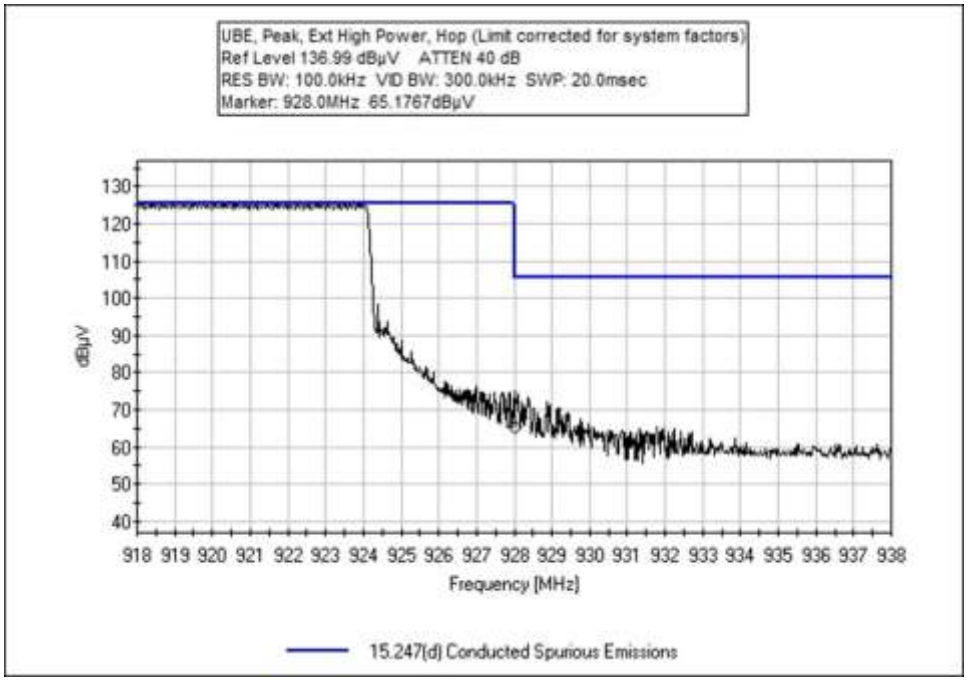
Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Hopping				
Frequency (MHz)	**Modulation**	**Measured (dBuV)**	**Limit (dBuV)**	**Results**
902	FSK	85.4	< 116.4	Pass
928	FSK	76.0	< 116.4	Pass

Band Edge Plots






LBE, Peak, Ext High Power, Hop (Limit corrected for system factors)
Ref Level 136.99 dBµV ATTEN 40 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 73.3137dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


UBE, Peak, Ext High Power, Hop (Limit corrected for system factors)
Ref Level 136.99 dBµV ATTEN 40 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 65.1767dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**105444**	Date:	7/12/2021
Test Type:	**Conducted Emissions**	Time:	08:21:53
Tested By:	Matt Harrison	Sequence#:	3
Software:	EMITest 5.03.19		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Frequency: Band Edge

Setup: EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is transmitting with modulation.

Test Location: Bothell Lab Bench
Temperature (ºC): 23
Relative Humidity (%): 44
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07670	Attenuator		8/20/2020	8/20/2022
T2	ANP06454	Cable	Heliax	1/20/2020	1/20/2022
T3	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
T4	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023

Measurement Data: Reading listed by margin. Test Lead: RF Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	64.6	+20.1	+0.7	+0.0	+0.0	+0.0	85.4	116.4	-31.0	RF Po
2	928.000M	63.9	+20.1	+0.7	+0.0	+0.0	+0.0	84.7	116.4	-31.7	RF Po
3	902.000M	73.3	+0.0	+0.7	+0.0	+10.1	+0.0	84.1	116.4 Hopping	-32.3	RF Po
4	928.000M	65.2	+0.0	+0.7	+0.0	+10.1	+0.0	76.0	116.4 Hopping	-40.4	RF Po

Test Setup Photo(s)

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/6/2021
Test Type:	**Maximized Emissions**	Time:	08:19:29
Tested By:	Michael Atkinson	Sequence#:	9
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

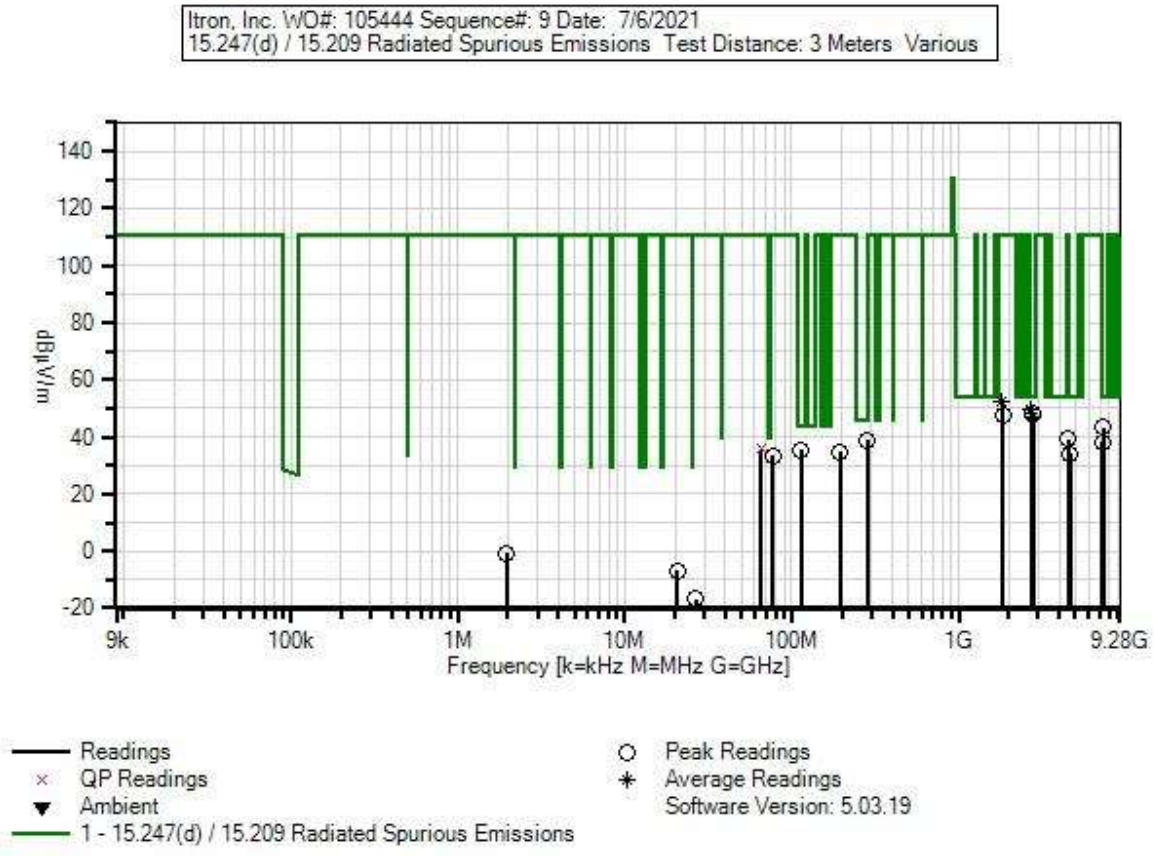
Frequency: 9kHz to 10GHz

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported.

EUT with external attached antenna.

EUT continuously transmitting during average measurements. 45% duty cycle correction factor applied on transmitter harmonics.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T7	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T8	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T10	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T11	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T12	AN45% DCCF	Test Data Adjustment		6/24/2021	6/24/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2724.220M	57.1	+0.0	+0.7	+2.9	-34.1	+0.0	49.8	54.0	-4.2	Horiz
	Ave		+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+29.4	-6.9					
^	2724.220M	61.9	+0.0	+0.7	+2.9	-34.1	+0.0	54.6	54.0	+0.6	Horiz
			+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+29.4	-6.9					
3	2771.930M	55.7	+0.0	+0.7	+2.9	-34.1	+0.0	48.3	54.0	-5.7	Horiz
			+0.3	+0.4	+0.0	+0.0			924		
			+0.0	+0.0	+29.3	-6.9					
4	2747.860M	54.3	+0.0	+0.7	+2.9	-34.1	+0.0	46.9	54.0	-7.1	Horiz
	Ave		+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+29.3	-6.9					
^	2747.860M	59.5	+0.0	+0.7	+2.9	-34.1	+0.0	52.1	54.0	-1.9	Horiz
			+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+29.3	-6.9					
6	114.400M	20.4	+0.0	+0.1	+0.0	+0.0	+0.0	35.5	43.5	-8.0	Horiz
			+0.0	+0.0	+0.0	+0.5					
			+0.6	+13.9	+0.0	+0.0					
7	7327.990M	40.1	+0.0	+1.3	+5.2	-34.9	+0.0	43.4	54.0	-10.6	Vert
			+0.5	+0.6	+0.0	+0.0			916		
			+0.0	+0.0	+37.5	-6.9					
8	4539.890M	42.1	+0.0	+0.9	+3.7	-33.6	+0.0	39.2	54.0	-14.8	Horiz
			+0.3	+0.6	+0.0	+0.0			908		
			+0.0	+0.0	+32.1	-6.9					
9	7264.160M	35.5	+0.0	+1.1	+5.1	-34.9	+0.0	38.1	54.0	-15.9	Vert
			+0.5	+0.5	+0.0	+0.0			908		
			+0.0	+0.0	+37.2	-6.9					
10	4619.930M	36.6	+0.0	+0.9	+3.8	-33.6	+0.0	34.1	54.0	-19.9	Horiz
			+0.3	+0.6	+0.0	+0.0			924		
			+0.0	+0.0	+32.4	-6.9					
11	1816.120M	63.1	+0.0	+0.5	+2.4	-34.7	+0.0	52.5	110.6	-58.1	Vert
	Ave		+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+27.4	-6.9					
^	1816.120M	67.4	+0.0	+0.5	+2.4	-34.7	+0.0	56.8	110.6	-53.8	Vert
			+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+27.4	-6.9					
13	1831.880M	58.1	+0.0	+0.5	+2.4	-34.7	+0.0	47.6	110.6	-63.0	Horiz
			+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+27.5	-6.9					
14	1848.190M	57.8	+0.0	+0.5	+2.4	-34.7	+0.0	47.4	110.6	-63.2	Horiz
			+0.3	+0.4	+0.0	+0.0			924		
			+0.0	+0.0	+27.6	-6.9					
15	285.100M	19.1	+0.0	+0.2	+0.0	+0.0	+0.0	39.1	110.6	-71.5	Horiz
			+0.0	+0.0	+0.0	+0.8					
			+1.0	+18.0	+0.0	+0.0					

16	65.840M	21.9	+0.0	+0.1	+0.0	+0.0	+0.0	35.8	110.6	-74.8	Vert
	QP		+0.0	+0.0	+0.0	+0.4					
			+0.5	+12.9	+0.0	+0.0					
^	65.840M	24.8	+0.0	+0.1	+0.0	+0.0	+0.0	38.7	110.6	-71.9	Vert
			+0.0	+0.0	+0.0	+0.4					
			+0.5	+12.9	+0.0	+0.0					
18	193.900M	17.5	+0.0	+0.2	+0.0	+0.0	+0.0	34.7	110.6	-75.9	Horiz
			+0.0	+0.0	+0.0	+0.7					
			+0.8	+15.5	+0.0	+0.0					
19	76.600M	19.6	+0.0	+0.1	+0.0	+0.0	+0.0	33.3	110.6	-77.3	Horiz
			+0.0	+0.0	+0.0	+0.4					
			+0.5	+12.7	+0.0	+0.0					
20	1.958M	29.7	+0.0	+0.0	+0.1	+0.0	-40.0	-0.7	110.6	-111.3	Para
			+0.0	+0.0	+9.5	+0.0					
			+0.0	+0.0	+0.0	+0.0					
21	20.553M	25.8	+0.0	+0.1	+0.2	+0.0	-40.0	-6.7	110.6	-117.3	Para
			+0.0	+0.0	+7.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
22	26.581M	17.3	+0.0	+0.1	+0.3	+0.0	-40.0	-16.6	110.6	-127.2	Para
			+0.0	+0.0	+5.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/6/2021
Test Type:	**Maximized Emissions**	Time:	13:47:44
Tested By:	Michael Atkinson	Sequence#:	10
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

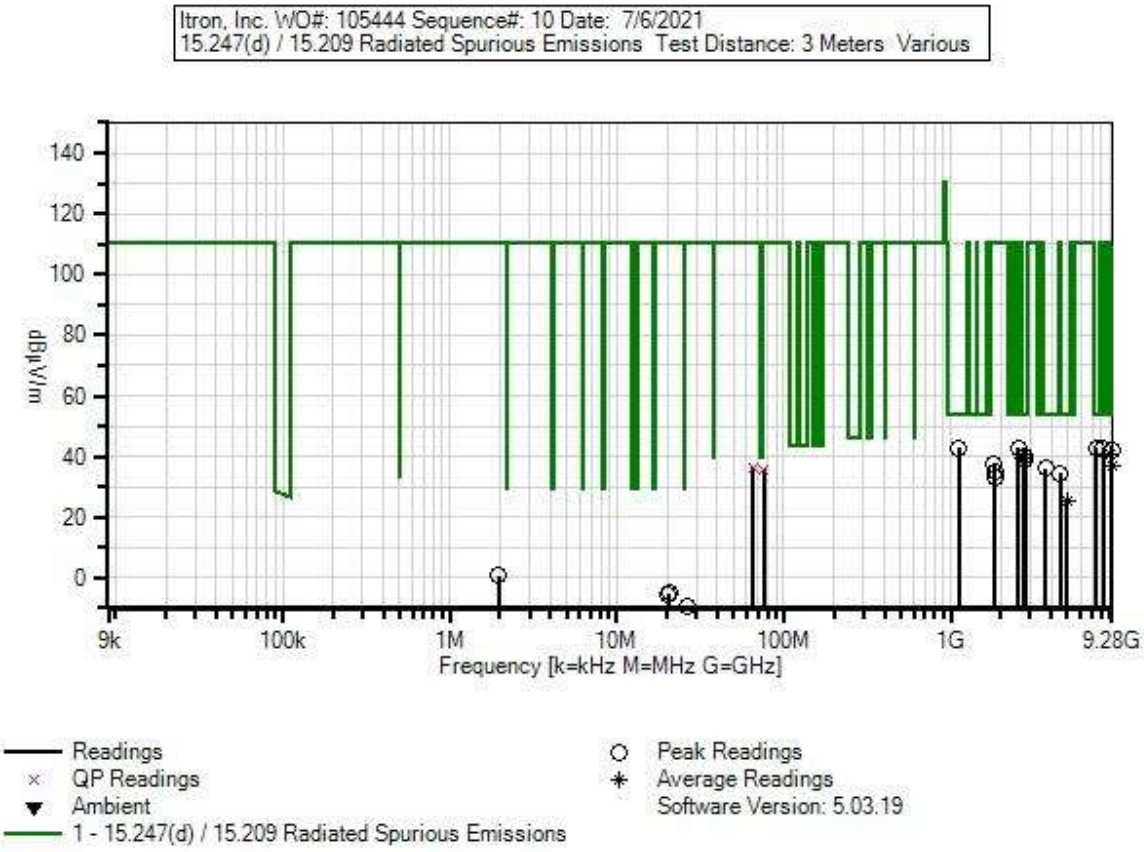
Frequency: 9kHz to 10GHz

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported.

EUT with external vehicle antenna.

EUT continuously transmitting during average measurements. 45% duty cycle correction factor applied on transmitter harmonics.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T7	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T8	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T10	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T11	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T12	AN45% DCCF	Test Data Adjustment		6/24/2021	6/24/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	8172.510M	38.1	+0.0	+1.5	+5.3	-35.0	+0.0	42.9	54.0	-11.1	Vert
			+0.4	+0.9	+0.0	+0.0			908		
			+0.0	+0.0	+38.6	-6.9					
2	1114.000M	49.7	+0.0	+0.4	+1.8	-36.5	+0.0	42.8	54.0	-11.2	Vert
			+0.3	+2.4	+0.0	+0.0			924		
			+0.0	+0.0	+24.7	+0.0					
3	7392.460M	39.4	+0.0	+1.4	+5.3	-34.9	+0.0	42.8	54.0	-11.2	Vert
			+0.5	+0.6	+0.0	+0.0			924		
			+0.0	+0.0	+37.4	-6.9					
4	9160.320M	37.1	+0.0	+1.5	+5.8	-34.4	+0.0	41.8	54.0	-12.2	Vert
			+0.5	+0.5	+0.0	+0.0			916		
			+0.0	+0.0	+37.7	-6.9					
5	9080.080M	36.2	+0.0	+1.4	+5.8	-34.6	+0.0	40.9	54.0	-13.1	Vert
	Ave		+0.5	+0.5	+0.0	+0.0			908		
			+0.0	+0.0	+38.0	-6.9					
^	9080.080M	46.1	+0.0	+1.4	+5.8	-34.6	+0.0	50.8	54.0	-3.2	Vert
			+0.5	+0.5	+0.0	+0.0			908		
			+0.0	+0.0	+38.0	-6.9					
7	2748.160M	47.6	+0.0	+0.7	+2.9	-34.1	+0.0	40.2	54.0	-13.8	Horiz
			+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+29.3	-6.9					
8	2747.960M	46.7	+0.0	+0.7	+2.9	-34.1	+0.0	39.3	54.0	-14.7	Vert
	Ave		+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+29.3	-6.9					
^	2747.960M	51.9	+0.0	+0.7	+2.9	-34.1	+0.0	44.5	54.0	-9.5	Vert
			+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+29.3	-6.9					
10	2724.040M	46.5	+0.0	+0.7	+2.9	-34.1	+0.0	39.2	54.0	-14.8	Vert
	Ave		+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+29.4	-6.9					
^	2724.040M	51.6	+0.0	+0.7	+2.9	-34.1	+0.0	44.3	54.0	-9.7	Vert
			+0.3	+0.4	+0.0	+0.0			908		
			+0.0	+0.0	+29.4	-6.9					
12	2771.880M	46.2	+0.0	+0.7	+2.9	-34.1	+0.0	38.8	54.0	-15.2	Vert
			+0.3	+0.4	+0.0	+0.0			924		
			+0.0	+0.0	+29.3	-6.9					
13	3696.040M	39.7	+0.0	+0.9	+3.5	-33.8	+0.0	36.1	54.0	-17.9	Vert
			+0.3	+0.5	+0.0	+0.0			924		
			+0.0	+0.0	+31.9	-6.9					
14	4539.870M	37.3	+0.0	+0.9	+3.7	-33.6	+0.0	34.4	54.0	-19.6	Vert
			+0.3	+0.6	+0.0	+0.0			908		
			+0.0	+0.0	+32.1	-6.9					
15	4988.771M	26.1	+0.0	+0.9	+3.8	-33.4	+0.0	25.3	54.0	-28.7	Vert
	Ave		+0.5	+0.5	+0.0	+0.0			924		
			+0.0	+0.0	+33.8	-6.9					

^	4988.771M	48.9	+0.0 +0.5 +0.0	+0.9 +0.5 +0.0	+3.8 +0.0 +33.8	-33.4 +0.0 -6.9	+0.0	48.1	54.0 924	-5.9	Vert
17	2521.000M	43.4	+0.0 +0.3 +0.0	+0.6 +0.4 +0.0	+2.8 +0.0 +29.6	-34.2 +0.0 +0.0	+0.0	42.9	110.6 924	-67.7	Vert
18	1816.070M	47.8	+0.0 +0.3 +0.0	+0.5 +0.4 +0.0	+2.4 +0.0 +27.4	-34.7 +0.0 -6.9	+0.0	37.2	110.6 908	-73.4	Vert
19	9240.660M Ave	31.5	+0.0 +0.5 +0.0	+1.5 +0.5 +0.0	+5.7 +0.0 +38.0	-34.2 +0.0 -6.9	+0.0	36.6	110.6 924	-74.0	Vert
^	9240.660M	42.0	+0.0 +0.5 +0.0	+1.5 +0.5 +0.0	+5.7 +0.0 +38.0	-34.2 +0.0 -6.9	+0.0	47.1	110.6 924	-63.5	Vert
21	65.080M QP	22.5	+0.0 +0.0 +0.5	+0.1 +0.0 +12.8	+0.0 +0.0 +0.0	+0.0 +0.4 +0.0	+0.0	36.3	110.6	-74.3	Vert/
^	65.080M	28.2	+0.0 +0.0 +0.5	+0.1 +0.0 +12.8	+0.0 +0.0 +0.0	+0.0 +0.4 +0.0	+0.0	42.0	110.6	-68.6	Vert/
23	75.820M QP	21.9	+0.0 +0.0 +0.5	+0.1 +0.0 +12.8	+0.0 +0.0 +0.0	+0.0 +0.4 +0.0	+0.0	35.7	110.6	-74.9	Vert/
^	75.820M	25.9	+0.0 +0.0 +0.5	+0.1 +0.0 +12.8	+0.0 +0.0 +0.0	+0.0 +0.4 +0.0	+0.0	39.7	110.6	-70.9	Vert/
25	1847.920M	45.6	+0.0 +0.3 +0.0	+0.5 +0.4 +0.0	+2.4 +0.0 +27.6	-34.7 +0.0 -6.9	+0.0	35.2	110.6 924	-75.4	Vert
26	1832.260M	43.7	+0.0 +0.3 +0.0	+0.5 +0.4 +0.0	+2.4 +0.0 +27.5	-34.7 +0.0 -6.9	+0.0	33.2	110.6 916	-77.4	Vert
27	1.958M	31.1	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.1 +9.5 +0.0	+0.0 +0.0 +0.0	-40.0	0.7	110.6	-109.9	Para
28	20.553M	27.4	+0.0 +0.0 +0.0	+0.1 +0.0 +0.0	+0.2 +7.2 +0.0	+0.0 +0.0 +0.0	-40.0	-5.1	110.6	-115.7	Para
29	20.223M	26.8	+0.0 +0.0 +0.0	+0.1 +0.0 +0.0	+0.2 +7.3 +0.0	+0.0 +0.0 +0.0	-40.0	-5.6	110.6	-116.2	Groun
30	26.401M	24.5	+0.0 +0.0 +0.0	+0.1 +0.0 +0.0	+0.3 +5.8 +0.0	+0.0 +0.0 +0.0	-40.0	-9.3	110.6	-119.9	Para
31	12.005M	19.8	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.2 +9.2 +0.0	+0.0 +0.0 +0.0	-40.0	-10.8	110.6	-121.4	Para

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/6/2021
Test Type:	**Maximized Emissions**	Time:	07:23:57
Tested By:	Michael Atkinson	Sequence#:	8
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

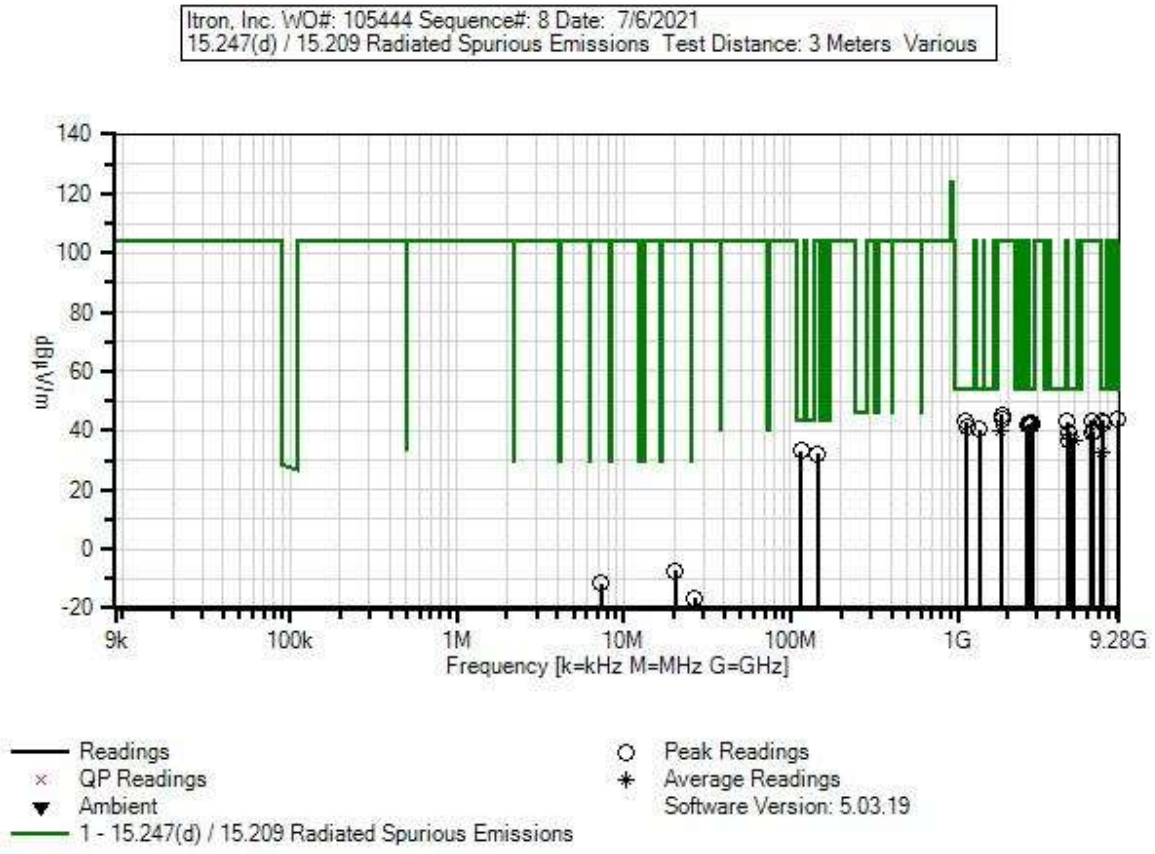
Frequency: 9kHz to 10GHz

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported.

EUT with internal antenna.

EUT continuously transmitting during average measurements. 45% duty cycle correction factor applied on transmitter harmonics.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T7	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T8	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T10	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T11	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T12	AN45% DCCF	Test Data Adjustment		6/24/2021	6/24/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9080.220M	38.9	+0.0 +0.5 +0.0	+1.4 +0.5 +0.0	+5.8 +0.0 +38.0	-34.6 +0.0 -6.9	+0.0	43.6	54.0 908 Z	-10.4	Vert
2	115.400M	18.0	+0.0 +0.0 +0.6	+0.1 +0.0 +13.8	+0.0 +0.0 +0.0	+0.0 +0.5 +0.0	+0.0	33.0	43.5	-10.5	Vert
3	7328.160M	40.1	+0.0 +0.5 +0.0	+1.3 +0.6 +0.0	+5.2 +0.0 +37.5	-34.9 +0.0 -6.9	+0.0	43.4	54.0 916	-10.6	Vert
4	1121.000M	50.5	+0.0 +0.2 +0.0	+0.4 +1.9 +0.0	+1.8 +0.0 +24.8	-36.4 +0.0 +0.0	+0.0	43.2	54.0	-10.8	Horiz
5	4540.120M	46.0	+0.0 +0.3 +0.0	+0.9 +0.6 +0.0	+3.7 +0.0 +32.1	-33.6 +0.0 -6.9	+0.0	43.1	54.0 908 Y	-10.9	Horiz
6	2771.700M	50.0	+0.0 +0.3 +0.0	+0.7 +0.4 +0.0	+2.9 +0.0 +29.3	-34.1 +0.0 -6.9	+0.0	42.6	54.0 924	-11.4	Vert
7	7391.580M	39.2	+0.0 +0.5 +0.0	+1.4 +0.6 +0.0	+5.3 +0.0 +37.4	-34.9 +0.0 -6.9	+0.0	42.6	54.0 924	-11.4	Vert
8	2680.000M	42.6	+0.0 +0.3 +0.0	+0.7 +0.4 +0.0	+2.9 +0.0 +29.6	-34.2 +0.0 +0.0	+0.0	42.3	54.0	-11.7	Horiz
9	2724.010M	49.5	+0.0 +0.3 +0.0	+0.7 +0.4 +0.0	+2.9 +0.0 +29.4	-34.1 +0.0 -6.9	+0.0	42.2	54.0 908 Y	-11.8	Horiz
10	2748.080M	49.5	+0.0 +0.3 +0.0	+0.7 +0.4 +0.0	+2.9 +0.0 +29.3	-34.1 +0.0 -6.9	+0.0	42.1	54.0 916	-11.9	Vert
11	1129.000M	48.9	+0.0 +0.2 +0.0	+0.4 +1.4 +0.0	+1.8 +0.0 +24.9	-36.4 +0.0 +0.0	+0.0	41.2	54.0	-12.8	Vert
12	1341.000M	47.3	+0.0 +0.2 +0.0	+0.4 +0.8 +0.0	+2.0 +0.0 +25.4	-35.6 +0.0 +0.0	+0.0	40.5	54.0	-13.5	Horiz
13	4620.360M	41.9	+0.0 +0.3 +0.0	+0.9 +0.6 +0.0	+3.8 +0.0 +32.4	-33.6 +0.0 -6.9	+0.0	39.4	54.0 924	-14.6	Vert
14	4579.940M	39.6	+0.0 +0.3 +0.0	+0.9 +0.6 +0.0	+3.8 +0.0 +32.2	-33.6 +0.0 -6.9	+0.0	36.9	54.0 916	-17.1	Horiz
15	4988.910M Ave	30.6	+0.0 +0.5 +0.0	+0.9 +0.5 +0.0	+3.8 +0.0 +33.8	-33.4 +0.0 +0.0	+0.0	36.7	54.0	-17.3	Vert

^	4988.910M	50.5	+0.0	+0.9	+3.8	-33.4	+0.0	56.6	54.0	+2.6	Vert
			+0.5	+0.5	+0.0	+0.0					
			+0.0	+0.0	+33.8	+0.0					
17	7264.050M	30.3	+0.0	+1.1	+5.1	-34.9	+0.0	32.9	54.0	-21.1	Horiz
	Ave		+0.5	+0.5	+0.0	+0.0			908 Y		
			+0.0	+0.0	+37.2	-6.9					
^	7264.050M	45.7	+0.0	+1.1	+5.1	-34.9	+0.0	48.3	54.0	-5.7	Horiz
			+0.5	+0.5	+0.0	+0.0			908 Y		
			+0.0	+0.0	+37.2	-6.9					
19	1848.120M	55.8	+0.0	+0.5	+2.4	-34.7	+0.0	45.4	104.1	-58.7	Horiz
			+0.3	+0.4	+0.0	+0.0			924		
			+0.0	+0.0	+27.6	-6.9					
20	1832.040M	54.5	+0.0	+0.5	+2.4	-34.7	+0.0	44.0	104.1	-60.1	Vert
			+0.3	+0.4	+0.0	+0.0			916		
			+0.0	+0.0	+27.5	-6.9					
21	6356.590M	42.2	+0.0	+1.0	+5.2	-34.0	+0.0	43.4	104.1	-60.7	Horiz
			+0.3	+0.5	+0.0	+0.0			908 Y		
			+0.0	+0.0	+35.1	-6.9					
22	2622.000M	42.0	+0.0	+0.6	+2.8	-34.2	+0.0	41.8	104.1	-62.3	Horiz
			+0.3	+0.4	+0.0	+0.0					
			+0.0	+0.0	+29.9	+0.0					
23	6467.900M	38.3	+0.0	+1.2	+5.4	-34.0	+0.0	39.9	104.1	-64.2	Vert
			+0.5	+0.5	+0.0	+0.0			924		
			+0.0	+0.0	+34.9	-6.9					
24	1815.968M	50.2	+0.0	+0.5	+2.4	-34.7	+0.0	39.6	104.1	-64.5	Vert
	Ave		+0.3	+0.4	+0.0	+0.0			908 Y		
			+0.0	+0.0	+27.4	-6.9					
^	1815.870M	53.3	+0.0	+0.5	+2.4	-34.7	+0.0	42.7	104.1	-61.4	Vert
			+0.3	+0.4	+0.0	+0.0			908 Y		
			+0.0	+0.0	+27.4	-6.9					
26	6411.540M	37.9	+0.0	+1.1	+5.3	-34.0	+0.0	39.3	104.1	-64.8	Vert
			+0.4	+0.5	+0.0	+0.0			916		
			+0.0	+0.0	+35.0	-6.9					
27	145.400M	16.9	+0.0	+0.1	+0.0	+0.0	+0.0	32.2	104.1	-71.9	Vert
			+0.0	+0.0	+0.0	+0.5					
			+0.7	+14.0	+0.0	+0.0					
28	20.313M	25.1	+0.0	+0.1	+0.2	+0.0	-40.0	-7.4	104.1	-111.5	Para
			+0.0	+0.0	+7.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
29	7.297M	19.2	+0.0	+0.0	+0.1	+0.0	-40.0	-11.5	104.1	-115.6	Para
			+0.0	+0.0	+9.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
30	26.611M	17.4	+0.0	+0.1	+0.3	+0.0	-40.0	-16.5	104.1	-120.6	Para
			+0.0	+0.0	+5.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					

Band Edge

Band Edge Summary					
Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	FSK	External Attached	39.8	<46	Pass
902	FSK	External Attached	78.9	< 110.6	Pass
928	FSK	External Attached	79.6	< 110.6	Pass
960	FSK	External Attached	44.9	<54	Pass
614	FSK	External Vehicle	39.8	<46	Pass
902	FSK	External Vehicle	73.7	< 110.6	Pass
928	FSK	External Vehicle	77.3	< 110.6	Pass
960	FSK	External Vehicle	44.6	<54	Pass
614	FSK	Internal	39.7	<46	Pass
902	FSK	Internal	60.3	< 110.6	Pass
928	FSK	Internal	63.6	< 110.6	Pass
960	FSK	Internal	49.1	<54	Pass

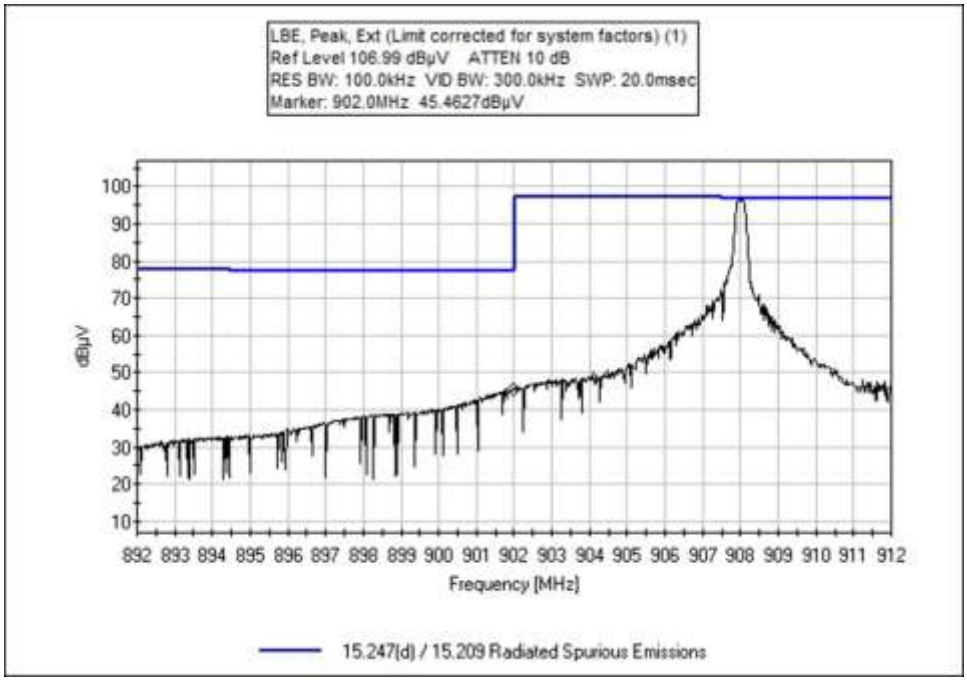
Note: Per ANSI C63.10 (2013) 100kHz RBW was used for restricted band edge peak data per 6.10.5.2 (e) (6) (iii). Graphical data was collected with 100kHz peaks, but at restricted bands a QP measurement with collected with 120kHz RBW. The 120kHz QP measurement is used for the final tabular data.

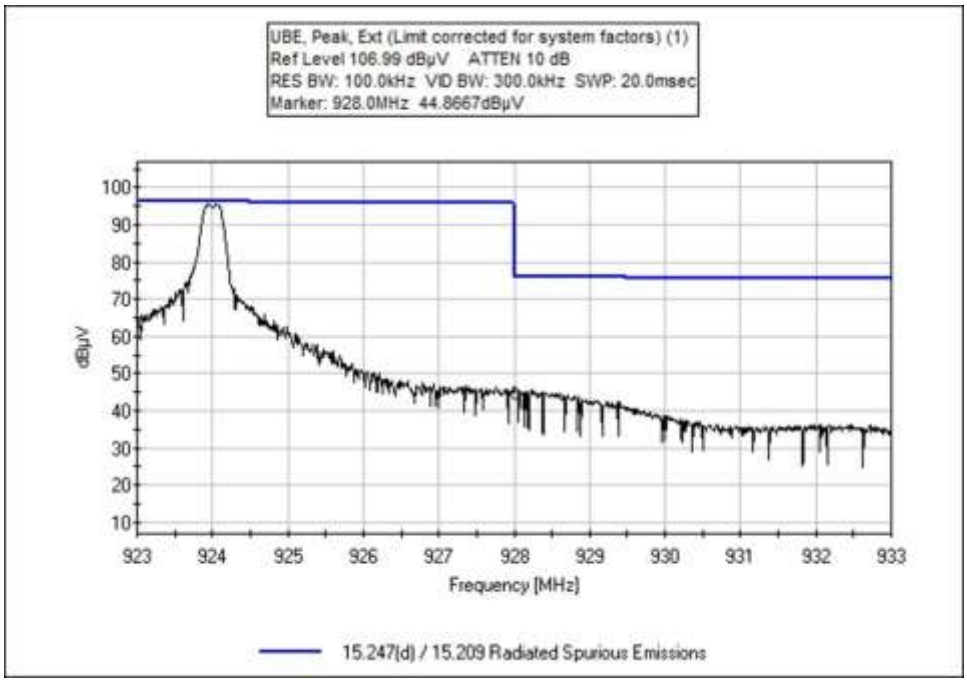
Band Edge Summary					
Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	FSK	External Attached	39.8	<46	Pass
902	FSK	External Attached	68.7	< 110.6	Pass
928	FSK	External Attached	77.0	< 110.6	Pass
960	FSK	External Attached	44.8	<54	Pass
614	FSK	External Vehicle	39.8	<46	Pass
902	FSK	External Vehicle	67.8	< 110.6	Pass
928	FSK	External Vehicle	72.5	< 110.6	Pass
960	FSK	External Vehicle	44.9	<54	Pass
614	FSK	Internal	39.7	<46	Pass
902	FSK	Internal	67.5	< 110.6	Pass
928	FSK	Internal	80.0	< 110.6	Pass
960	FSK	Internal	46.7	<54	Pass

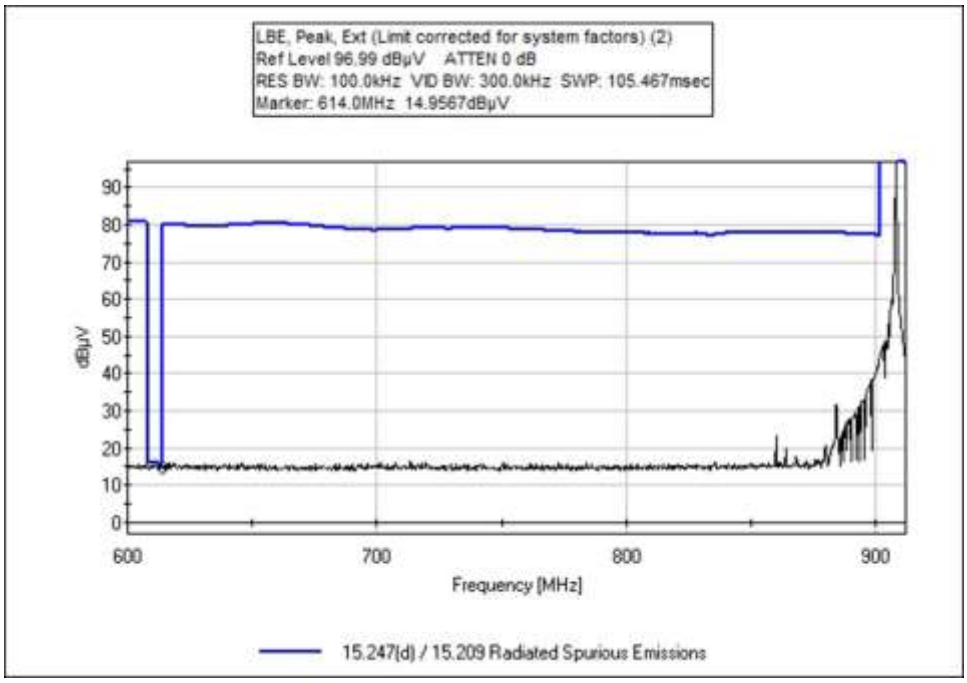
Note: Per ANSI C63.10 (2013) 100kHz RBW was used for restricted band edge peak data per 6.10.5.2 (e) (6) (iii). Graphical data was collected with 100kHz peaks, but at restricted bands a QP measurement with collected with 120kHz RBW. The 120kHz QP measurement is used for the final tabular data.

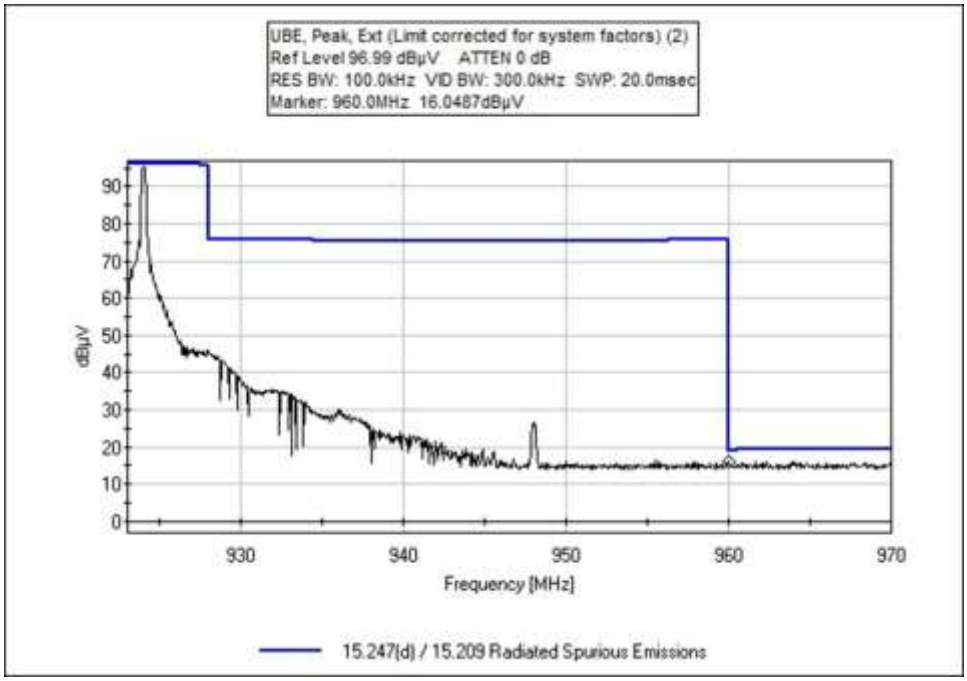
Band Edge Plots

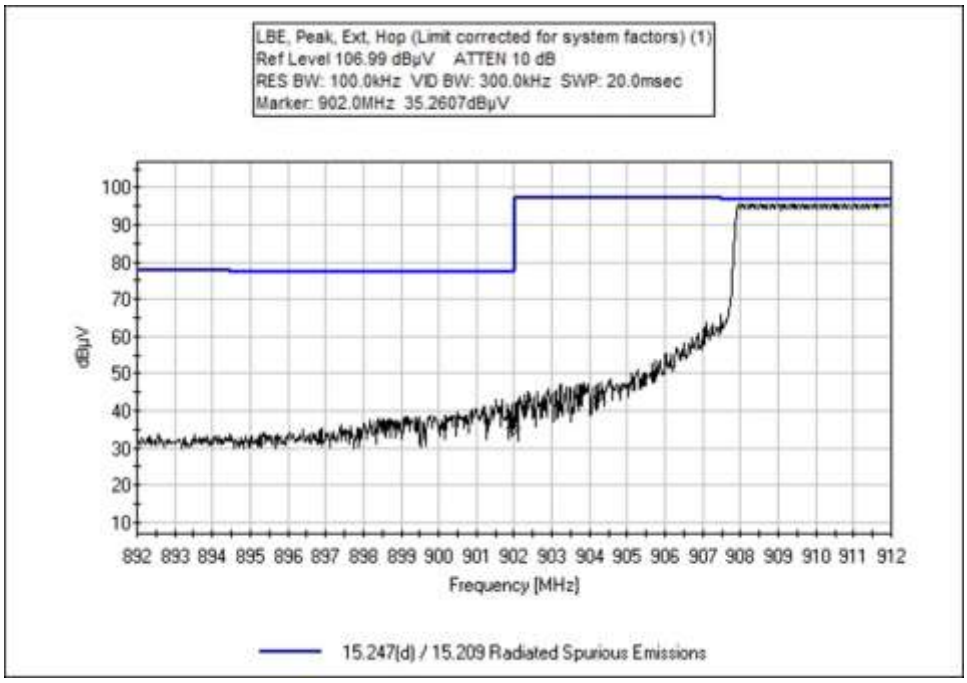
Configuration 3

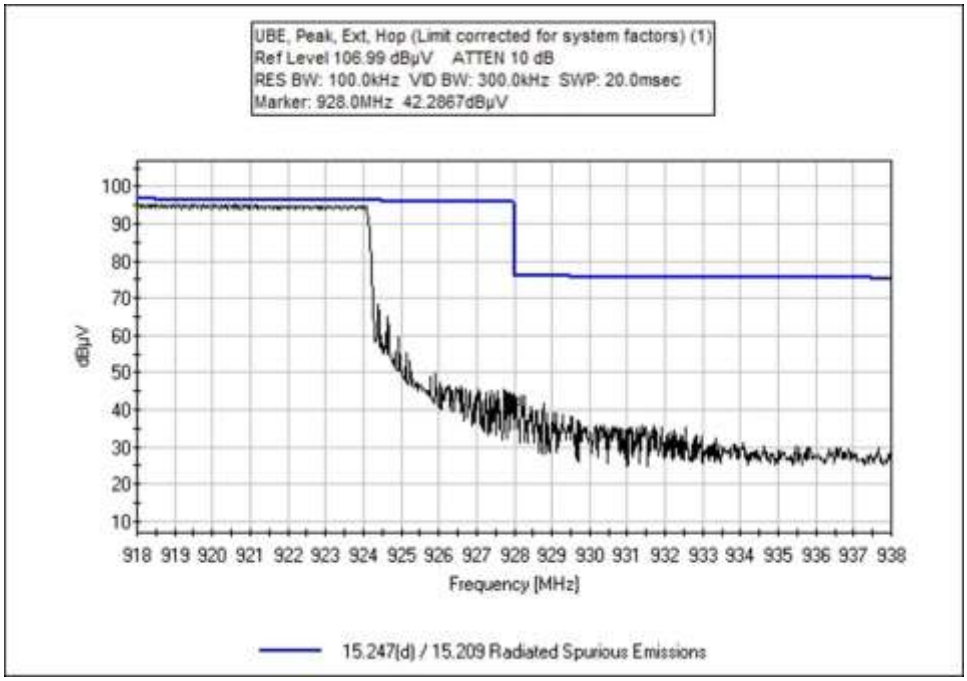


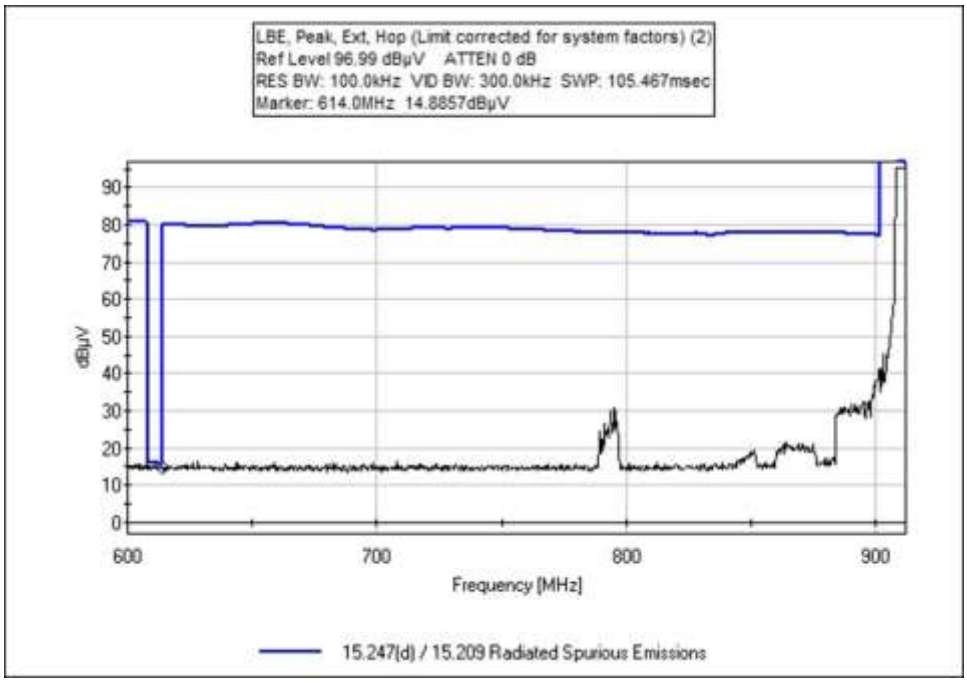


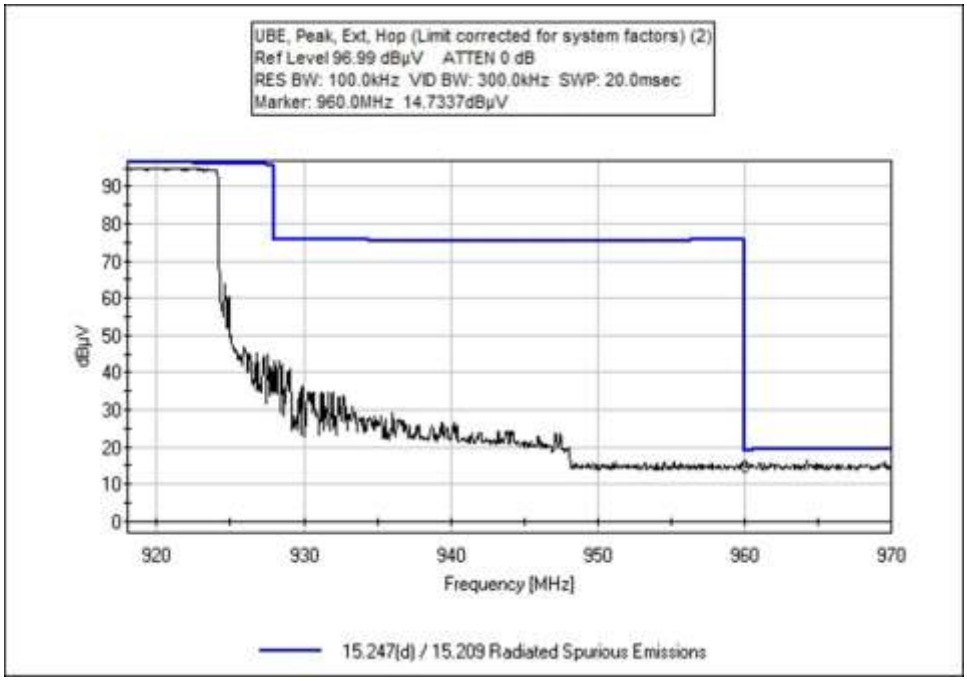

LBE, Peak, Ext (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 105.467msec
Marker: 614.0MHz 14.9567dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE, Peak, Ext (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 16.0487dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

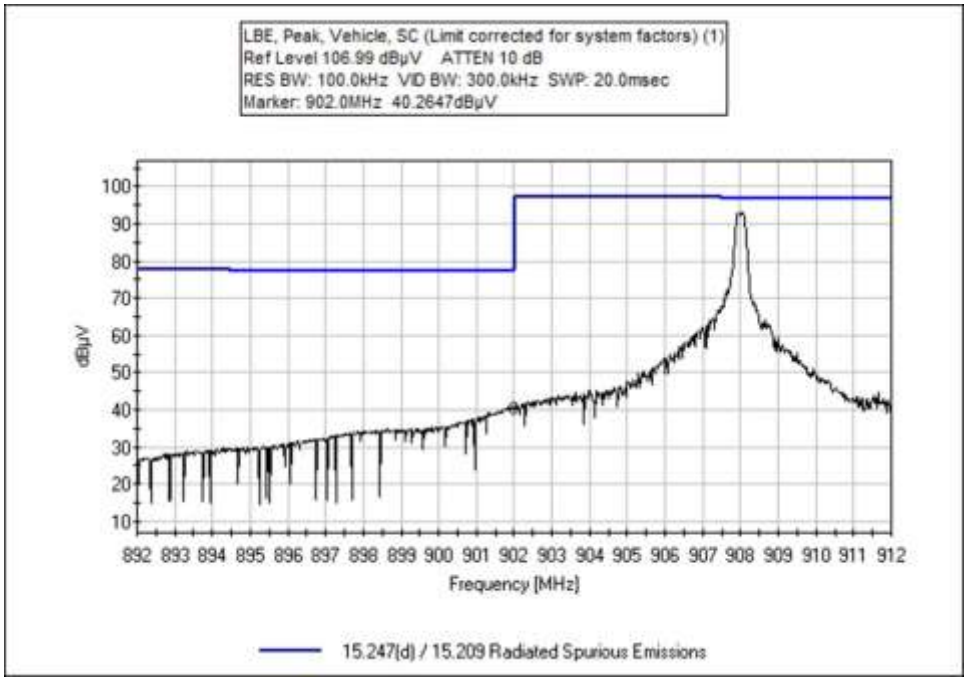

LBE, Peak, Ext, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 35.2607dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

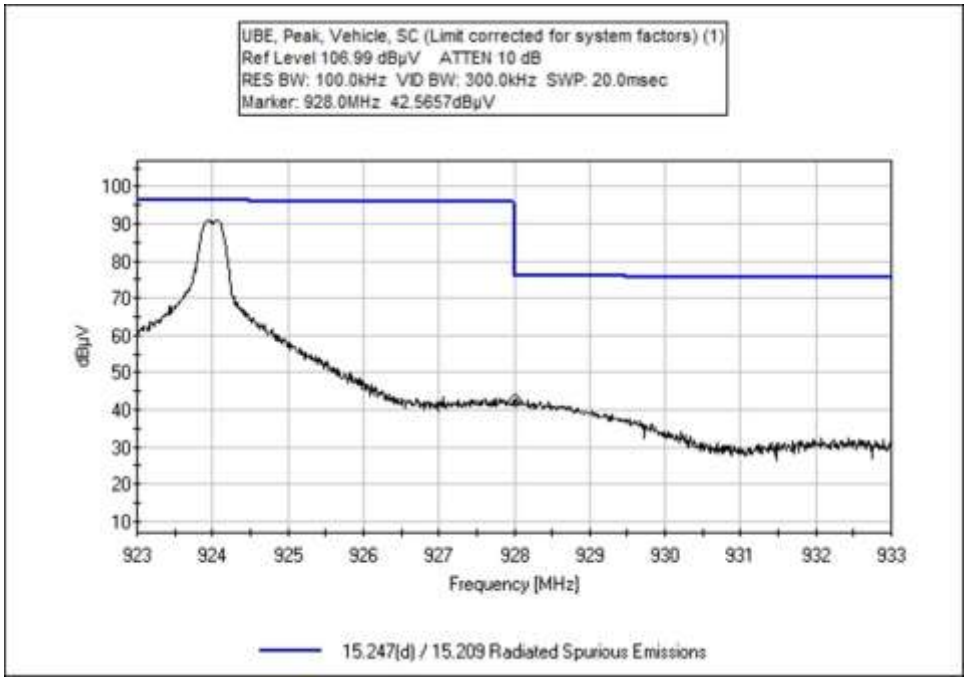

UBE, Peak, Ext, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 42.2867dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

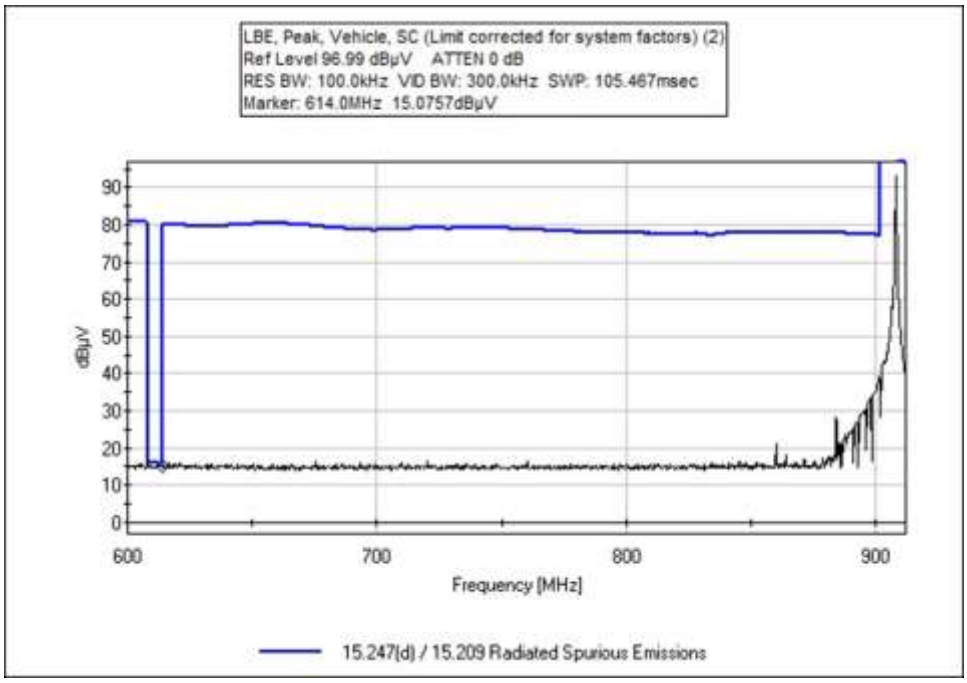

LBE, Peak, Ext, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 105.467msec
Marker: 614.0MHz 14.8857dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

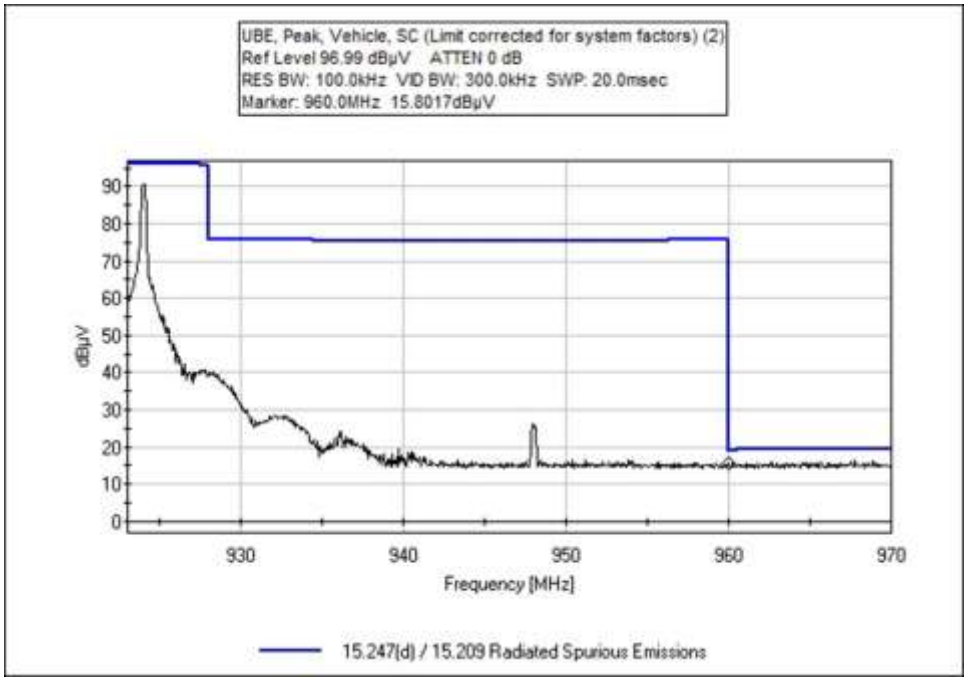

UBE, Peak, Ext, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 14.7337dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

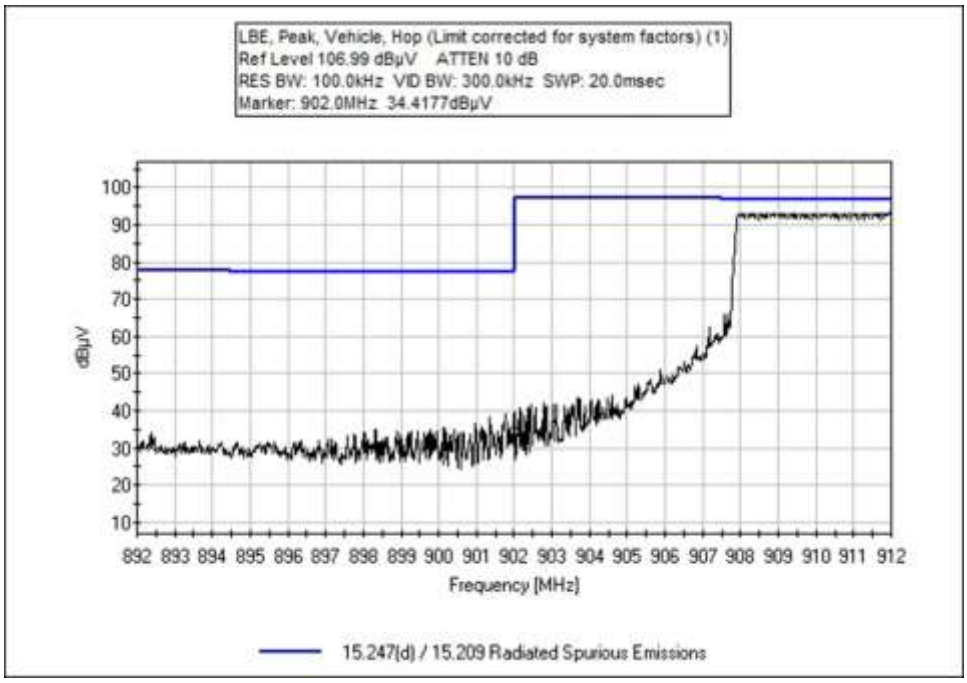
Configuration 5

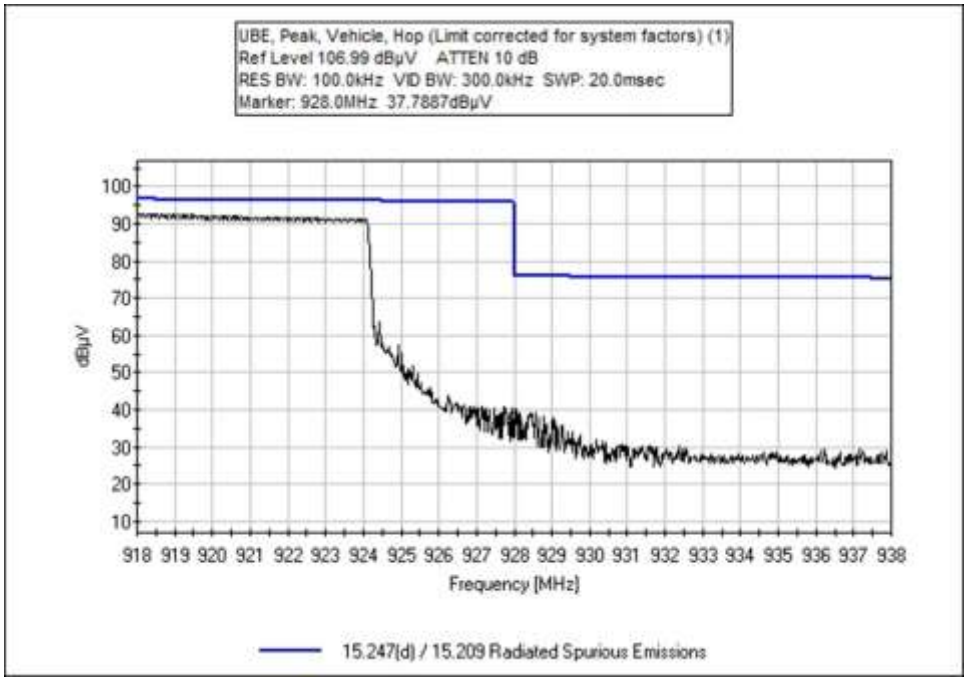


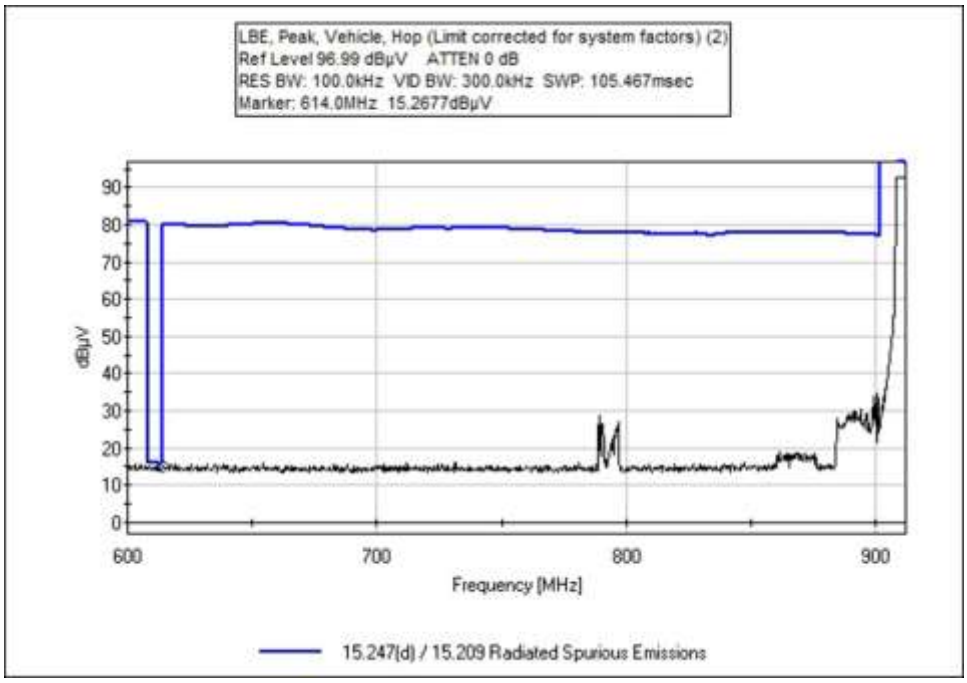


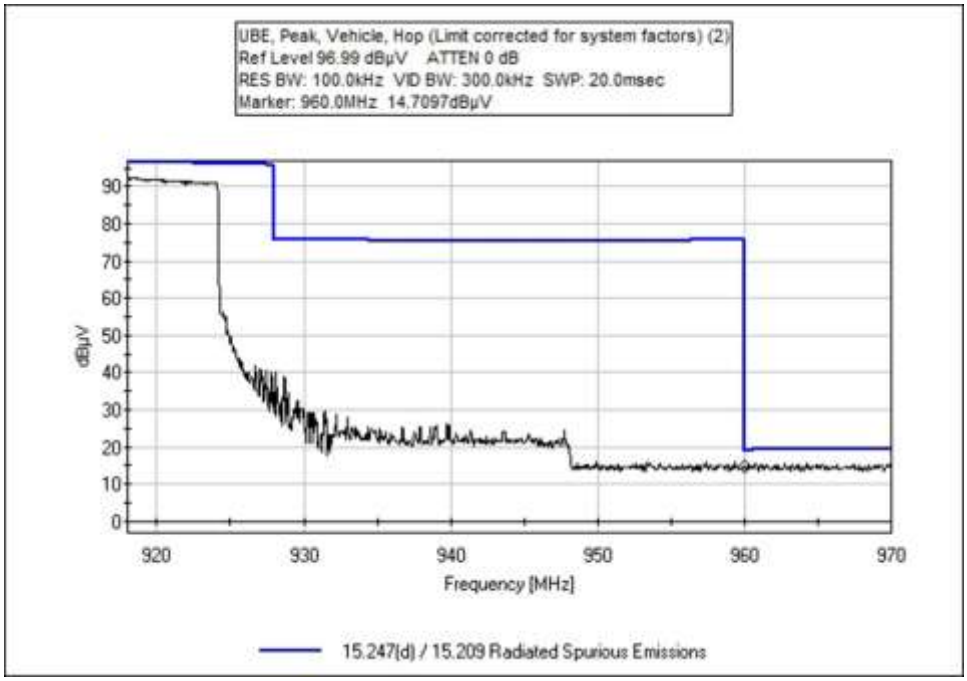

LBE, Peak, Vehicle, SC (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 105.467msec
Marker: 614.0MHz 15.0757dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE, Peak, Vehicle, SC (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 15.8017dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

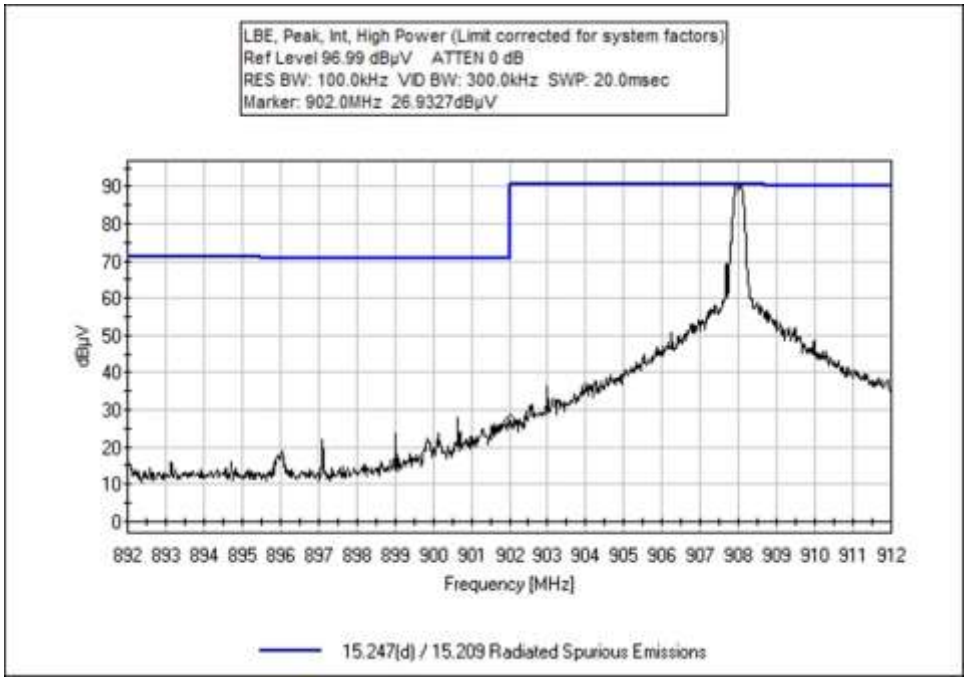

LBE, Peak, Vehicle, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 34.4177dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

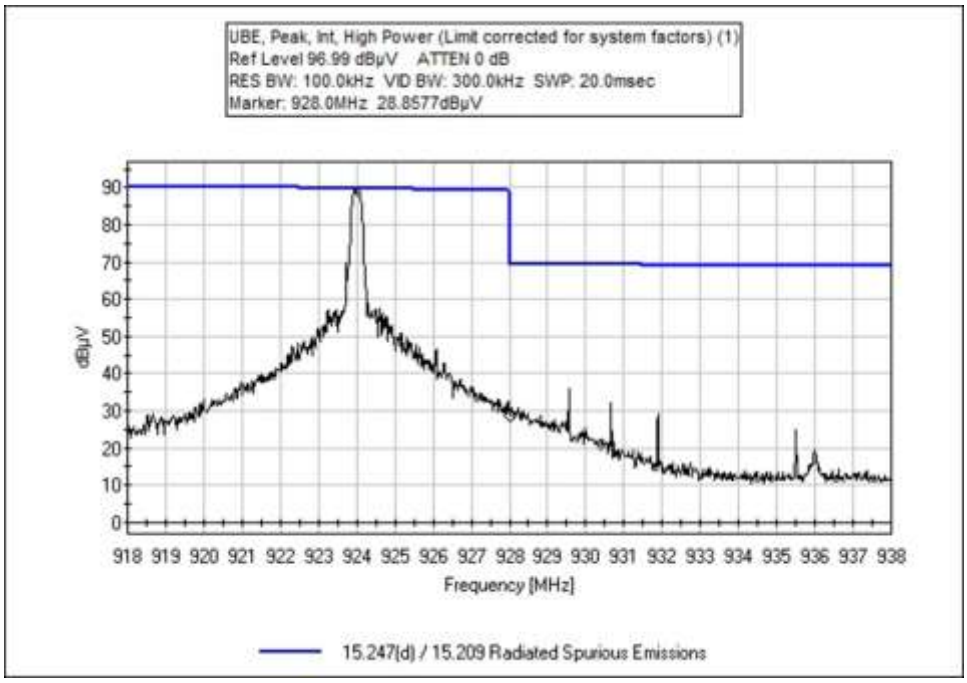

UBE, Peak, Vehicle, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 37.7887dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

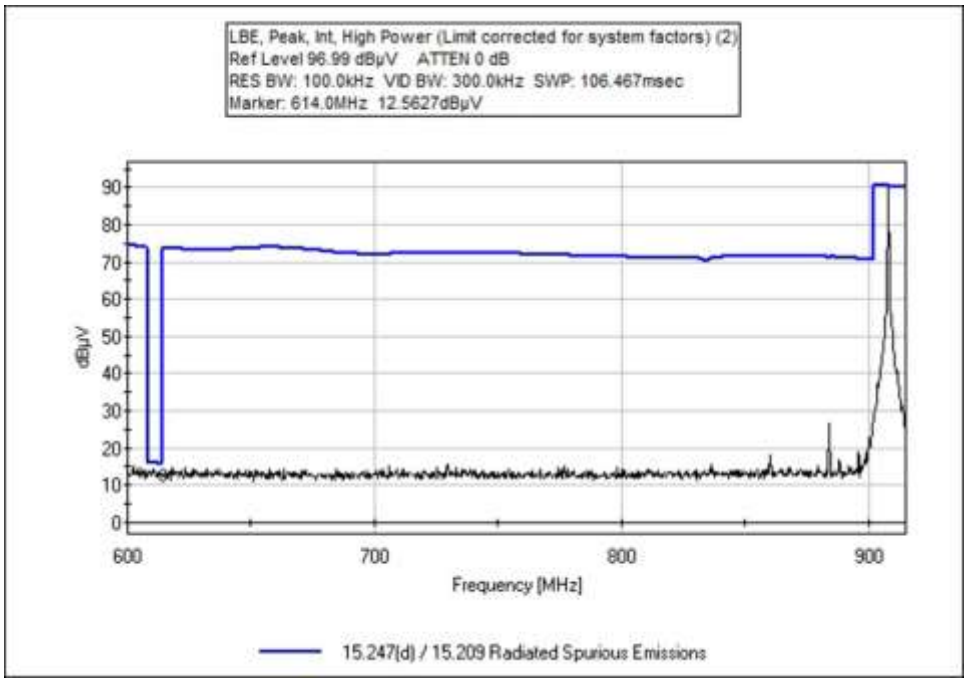

LBE, Peak, Vehicle, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 105.467msec
Marker: 614.0MHz 15.2677dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

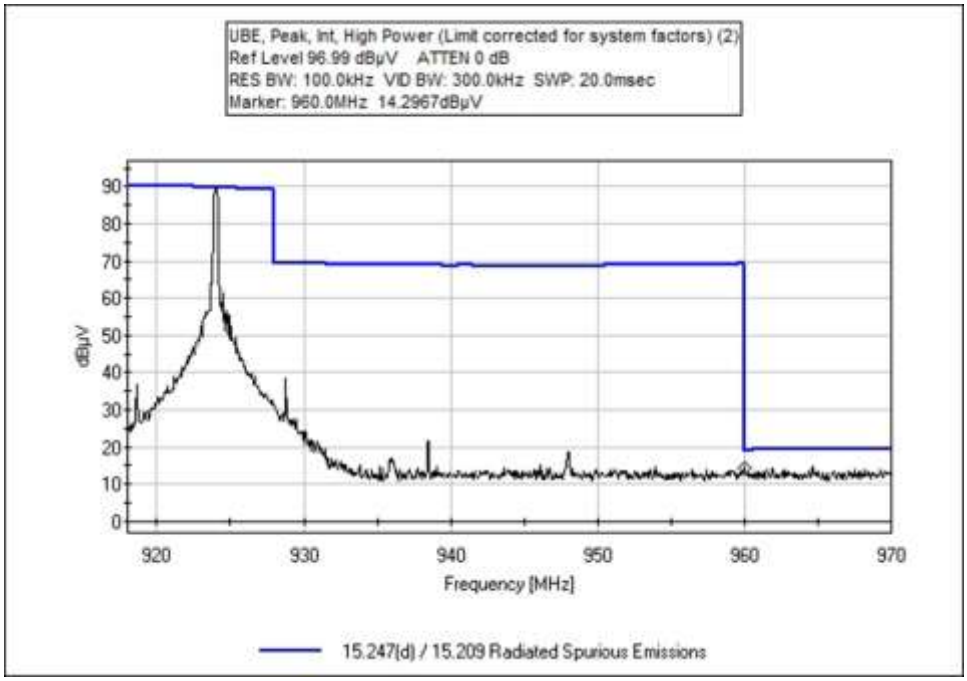

UBE, Peak, Vehicle, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 14.7097dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

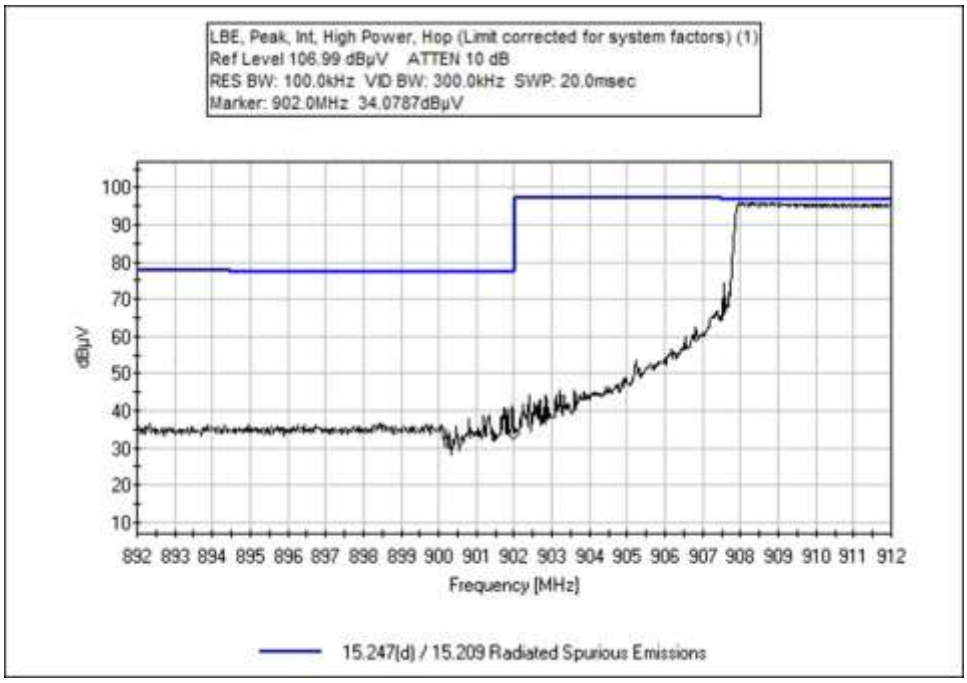
Configuration 7

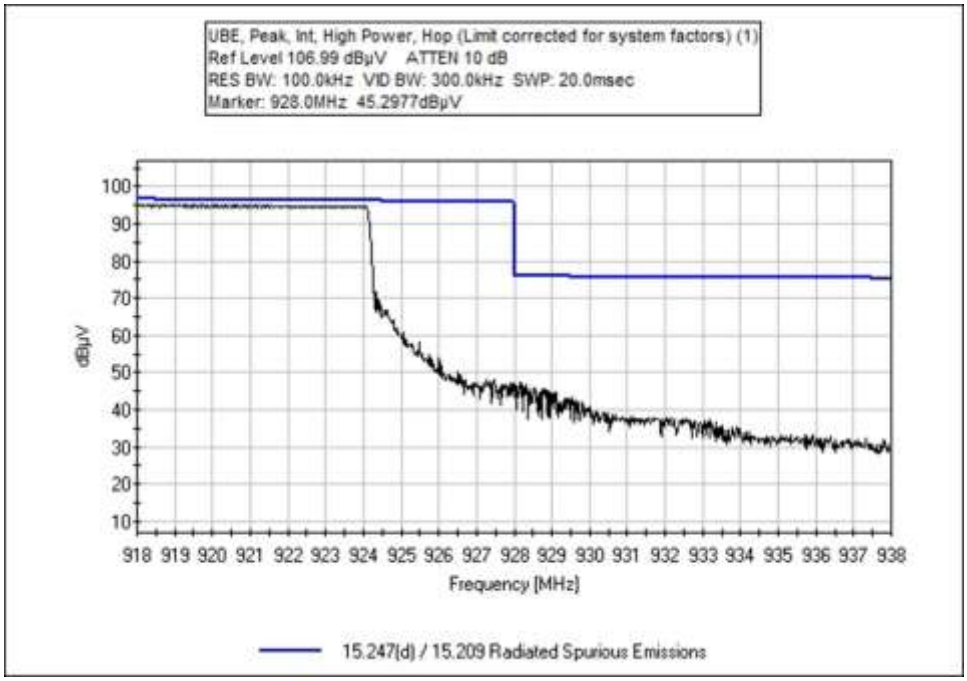


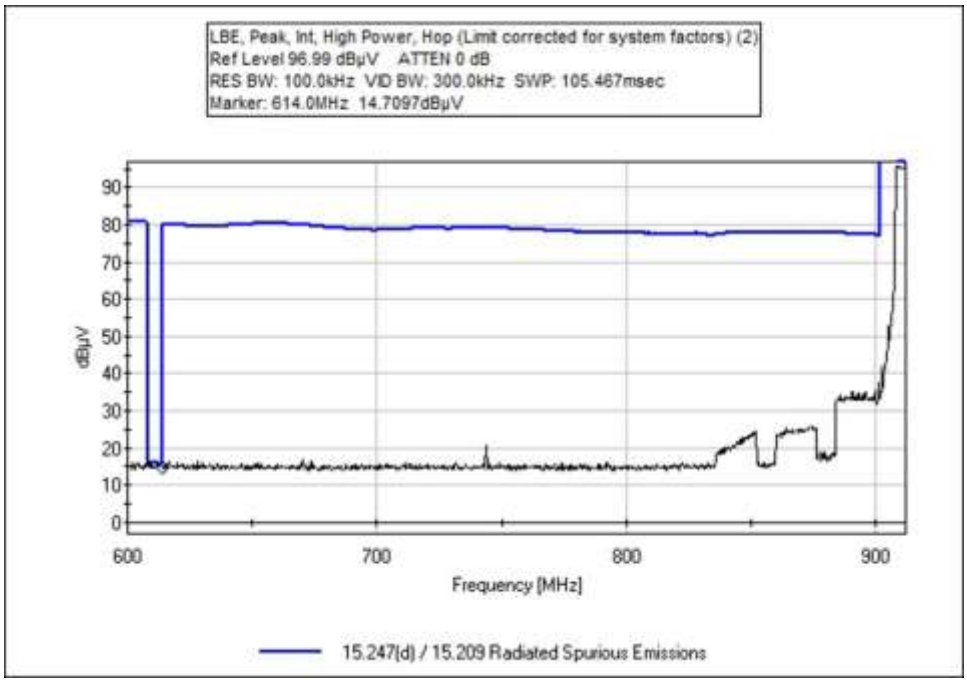


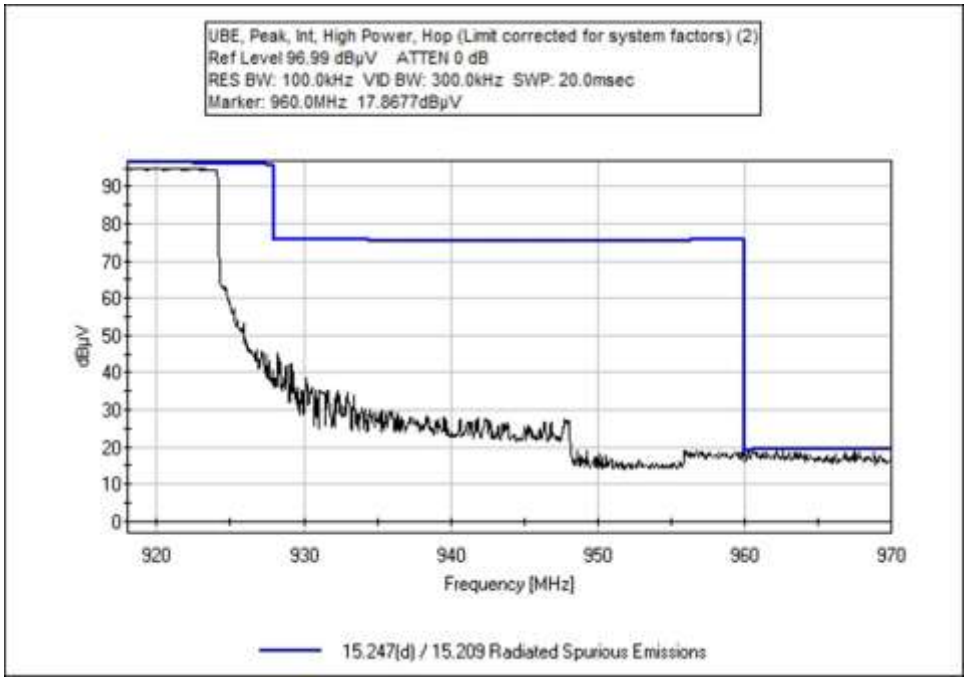

LBE, Peak, Int, High Power (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 106.467msec
Marker: 614.0MHz 12.5627dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE, Peak, Int, High Power (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 14.2967dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE, Peak, Int, High Power, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 34.0787dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE, Peak, Int, High Power, Hop (Limit corrected for system factors) (1)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 45.2977dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE, Peak, Int, High Power, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 105.467msec
Marker: 614.0MHz 14.7097dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE, Peak, Int, High Power, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 17.8677dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4362		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/12/2021
Test Type:	**Maximized Emissions**	Time:	11:08:40
Tested By:	Matt Harrison	Sequence#:	10
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Frequency: Band Edge

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

EUT with external attached antenna.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	9.4	+0.0	+0.3	+1.2	+1.7	+0.0	39.8	46.0	-6.2	Horiz
	QP		+27.2						Hopping		
2	614.000M	9.4	+0.0	+0.3	+1.2	+1.7	+0.0	39.8	46.0	-6.2	Horiz
	QP		+27.2								
^	614.000M	15.0	+0.0	+0.3	+1.2	+1.7	+0.0	45.4	46.0	-0.6	Horiz
			+27.2								
^	614.000M	14.9	+0.0	+0.3	+1.2	+1.7	+0.0	45.3	46.0	-0.7	Horiz
			+27.2						Hopping		
5	960.000M	10.1	+0.0	+0.4	+1.5	+2.2	+0.0	44.9	54.0	-9.1	Horiz
	QP		+30.7								
6	960.000M	10.0	+0.0	+0.4	+1.5	+2.2	+0.0	44.8	54.0	-9.2	Horiz
	QP		+30.7						Hopping		
^	960.000M	16.0	+0.0	+0.4	+1.5	+2.2	+0.0	50.8	54.0	-3.2	Horiz
			+30.7								
^	960.000M	14.7	+0.0	+0.4	+1.5	+2.2	+0.0	49.5	54.0	-4.5	Horiz
			+30.7						Hopping		
9	928.000M	44.9	+0.0	+0.4	+1.5	+2.2	+0.0	79.6	110.6	-31.0	Horiz
			+30.6								
10	902.000M	45.5	+0.0	+0.3	+1.4	+2.1	+0.0	78.9	110.6	-31.7	Horiz
			+29.6								
11	928.000M	42.3	+0.0	+0.4	+1.5	+2.2	+0.0	77.0	110.6	-33.6	Horiz
			+30.6						Hopping		
12	902.000M	35.3	+0.0	+0.3	+1.4	+2.1	+0.0	68.7	110.6	-41.9	Horiz
			+29.6						Hopping		

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/12/2021
Test Type:	**Maximized Emissions**	Time:	10:01:40
Tested By:	Matt Harrison	Sequence#:	11
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Frequency: Band Edge

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

EUT with external vehicle antenna.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	9.4	+0.0	+0.3	+1.2	+1.7	+0.0	39.8	46.0	-6.2	Vert
	QP		+27.2						Hopping		
2	614.000M	9.4	+0.0	+0.3	+1.2	+1.7	+0.0	39.8	46.0	-6.2	Vert
	QP		+27.2								
^	614.000M	15.3	+0.0	+0.3	+1.2	+1.7	+0.0	45.7	46.0	-0.3	Vert
			+27.2						Hopping		
^	614.000M	15.1	+0.0	+0.3	+1.2	+1.7	+0.0	45.5	46.0	-0.5	Vert
			+27.2								
5	960.000M	10.1	+0.0	+0.4	+1.5	+2.2	+0.0	44.9	54.0	-9.1	Vert
	QP		+30.7						Hopping		
6	960.000M	9.8	+0.0	+0.4	+1.5	+2.2	+0.0	44.6	54.0	-9.4	Vert
	QP		+30.7								
^	960.000M	15.8	+0.0	+0.4	+1.5	+2.2	+0.0	50.6	54.0	-3.4	Vert
			+30.7								
^	960.000M	14.7	+0.0	+0.4	+1.5	+2.2	+0.0	49.5	54.0	-4.5	Vert
			+30.7						Hopping		
9	928.000M	42.6	+0.0	+0.4	+1.5	+2.2	+0.0	77.3	110.6	-33.3	Vert
			+30.6								
10	902.000M	40.3	+0.0	+0.3	+1.4	+2.1	+0.0	73.7	110.6	-36.9	Vert
			+29.6								
11	928.000M	37.8	+0.0	+0.4	+1.5	+2.2	+0.0	72.5	110.6	-38.1	Vert
			+30.6						Hopping		
12	902.000M	34.4	+0.0	+0.3	+1.4	+2.1	+0.0	67.8	110.6	-42.8	Vert
			+29.6						Hopping		

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**105444**	Date:	7/12/2021
Test Type:	**Maximized Emissions**	Time:	13:05:36
Tested By:	Matt Harrison	Sequence#:	10
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Frequency: Band Edge

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

EUT with internal antenna.

Test Location: Bothell Lab C3
Temperature (ºC): 22-24
Relative Humidity (%): 40-50
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	9.3	+0.0	+0.3	+1.2	+1.7	+0.0	39.7	46.0	-6.3	Vert
	QP		+27.2								
2	614.000M	9.3	+0.0	+0.3	+1.2	+1.7	+0.0	39.7	46.0	-6.3	Vert
	QP		+27.2						Hopping		
^	614.000M	14.7	+0.0	+0.3	+1.2	+1.7	+0.0	45.1	46.0	-0.9	Vert
			+27.2						Hopping		
^	614.000M	12.6	+0.0	+0.3	+1.2	+1.7	+0.0	43.0	46.0	-3.0	Vert
			+27.2								
5	908.050M	90.5	+0.0	+0.3	+1.4	+2.1	+0.0	124.1	130.6	-6.5	Vert
			+29.8								
6	960.000M	11.9	+0.0	+0.4	+1.5	+2.2	+0.0	46.7	54.0	-7.3	Vert
	QP		+30.7						Hopping		
^	960.000M	17.9	+0.0	+0.4	+1.5	+2.2	+0.0	52.7	54.0	-1.3	Vert
			+30.7						Hopping		
^	960.000M	14.3	+0.0	+0.4	+1.5	+2.2	+0.0	49.1	54.0	-4.9	Vert
			+30.7								
9	928.000M	45.3	+0.0	+0.4	+1.5	+2.2	+0.0	80.0	110.6	-30.6	Vert
			+30.6						Hopping		
10	902.000M	34.1	+0.0	+0.3	+1.4	+2.1	+0.0	67.5	110.6	-43.1	Vert
			+29.6						Hopping		
11	928.000M	28.9	+0.0	+0.4	+1.5	+2.2	+0.0	63.6	110.6	-47.0	Vert
			+30.6								
12	902.000M	26.9	+0.0	+0.3	+1.4	+2.1	+0.0	60.3	110.6	-50.3	Vert
			+29.6								

Test Setup Photo(s)

Configuration 3

X Axis, View #1

X Axis, View #2

Y Axis

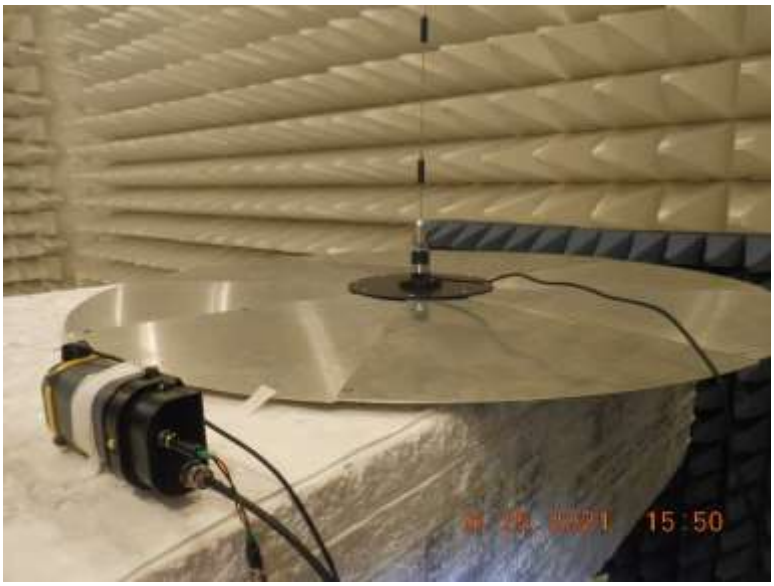
Z Axis

Below 1GHz

Above 1GHz

Configuration 5

X Axis



Y Axis

Z Axis

Below 1GHz

Above 1GHz

Configuration 7

X Axis

Y Axis

Z Axis

Below 1GHz

Above 1GHz

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**105444**	Date:	7/9/2021
Test Type:	**Conducted Emissions**	Time:	18:06:16
Tested By:	Michael Atkinson	Sequence#:	25
Software:	EMITest 5.03.19		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

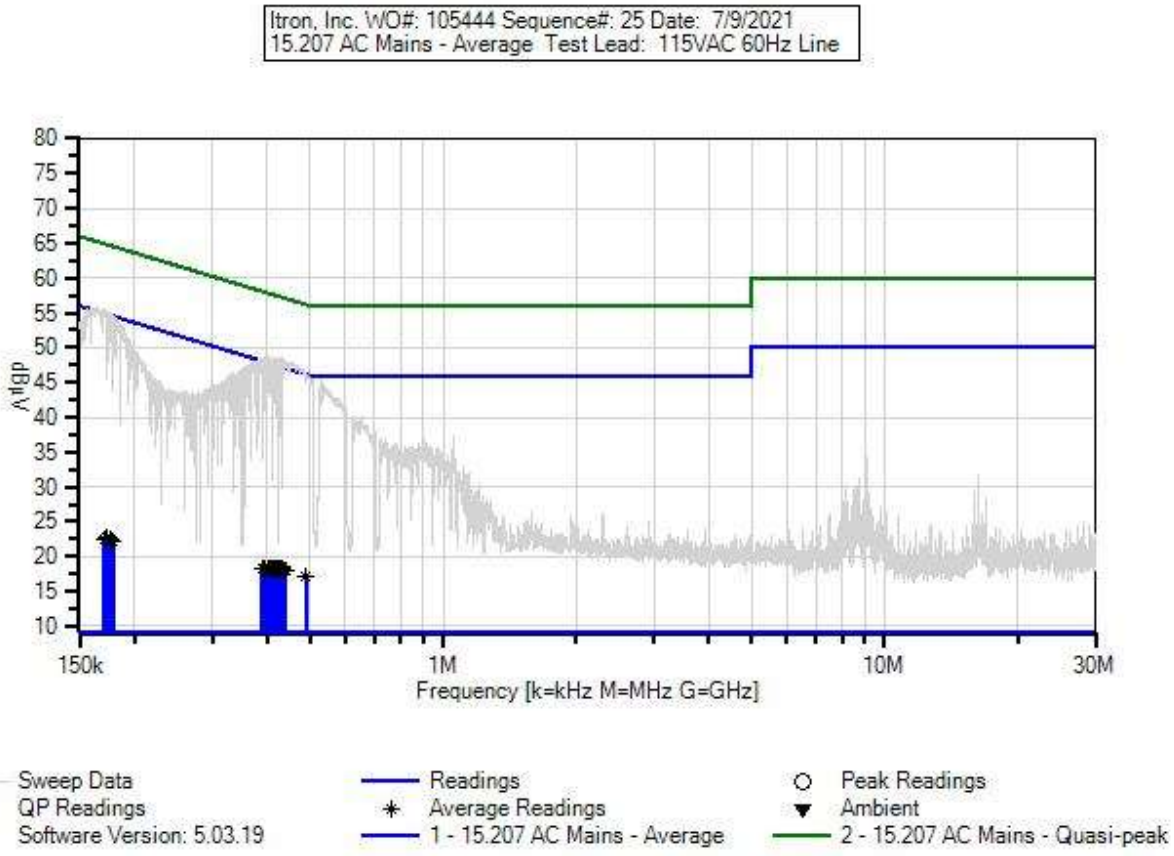
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to support tablet with USB cable. EUT is transmitting using test software on support tablet to control EUT. EUT is connected to a DC power supply which connects to AC mains.

High power and Low power ISM investigated, worst case reported. EUT has external attached antenna connected. Also investigated with vehicle antenna, data collected is representative of worst case.

Test Location: Bothell Lab C3
Test Method: ANSI C63.10 (2013)

Temperature (ºC): 22-24
Relative Humidity (%): 40-50



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data: Reading listed by margin. Test Lead: Line

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	432.633k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.2	-28.9	Line
	Ave		+0.7								
2	440.672k	8.1	+0.2	+0.0	+0.0	+9.1	+0.0	18.0	47.0	-29.0	Line
	Ave		+0.6								
^	440.671k	38.2	+0.2	+0.0	+0.0	+9.1	+0.0	48.1	47.0	+1.1	Line
			+0.6								
4	432.810k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.2	-29.0	Line
	Ave		+0.7								
5	489.960k	7.3	+0.2	+0.0	+0.0	+9.1	+0.0	17.2	46.2	-29.0	Line
	Ave		+0.6								
^	489.960k	36.6	+0.2	+0.0	+0.0	+9.1	+0.0	46.5	46.2	+0.3	Line
			+0.6								
7	427.471k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.3	-29.1	Line
	Ave		+0.7								
^	427.470k	38.7	+0.2	+0.0	+0.0	+9.1	+0.0	48.7	47.3	+1.4	Line
			+0.7								
9	434.624k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	47.2	-29.1	Line
	Ave		+0.6								
^	432.632k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.2	+1.4	Line
			+0.7								
^	434.624k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.2	+1.2	Line
			+0.6								
^	432.810k	37.9	+0.2	+0.0	+0.0	+9.1	+0.0	47.9	47.2	+0.7	Line
			+0.7								
13	422.130k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.4	-29.2	Line
	Ave		+0.6								
14	416.256k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.5	-29.3	Line
	Ave		+0.6								
15	417.858k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.5	-29.3	Line
	Ave		+0.6								
^	422.130k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.5	47.4	+1.1	Line
			+0.6								
17	407.889k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.7	-29.4	Line
	Ave		+0.6								
18	410.025k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.6	-29.4	Line
	Ave		+0.6								
^	407.889k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.7	+0.7	Line
			+0.6								
20	413.051k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.6	-29.4	Line
	Ave		+0.6								
^	416.255k	38.9	+0.2	+0.0	+0.0	+9.1	+0.0	48.8	47.5	+1.3	Line
			+0.6								
^	417.857k	38.8	+0.2	+0.0	+0.0	+9.1	+0.0	48.7	47.5	+1.2	Line
			+0.6								
^	413.051k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.5	47.6	+0.9	Line
			+0.6								
^	410.025k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.6	+0.8	Line
			+0.6								

25 Ave	400.590k	8.3	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	18.3	47.8	-29.5	Line
^	400.590k	39.0	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	49.0	47.8	+1.2	Line
27 Ave	392.758k	8.2	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	18.2	48.0	-29.8	Line
28 Ave	389.020k	8.3	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	18.2	48.1	-29.9	Line
^	392.757k	38.6	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	48.6	48.0	+0.6	Line
^	389.019k	38.6	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	48.5	48.1	+0.4	Line
31 Ave	173.683k	11.5	+0.4 +1.7	+0.0	+0.0	+9.1	+0.0	22.7	54.8	-32.1	Line
32 Ave	175.675k	11.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	22.6	54.7	-32.1	Line
33 Ave	177.142k	11.4	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.4	54.6	-32.2	Line
34 Ave	170.539k	11.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	22.6	54.9	-32.3	Line
^	170.539k	44.6	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	55.7	54.9	+0.8	Line
^	173.683k	44.2	+0.4 +1.7	+0.0	+0.0	+9.1	+0.0	55.4	54.8	+0.6	Line
37 Ave	178.818k	11.2	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.2	54.5	-32.3	Line
^	175.674k	44.1	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	55.2	54.7	+0.5	Line
^	177.141k	43.9	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	54.9	54.6	+0.3	Line
^	178.818k	43.7	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	54.7	54.5	+0.2	Line

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**105444**	Date:	7/9/2021
Test Type:	**Conducted Emissions**	Time:	18:16:31
Tested By:	Michael Atkinson	Sequence#:	26
Software:	EMITest 5.03.19		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

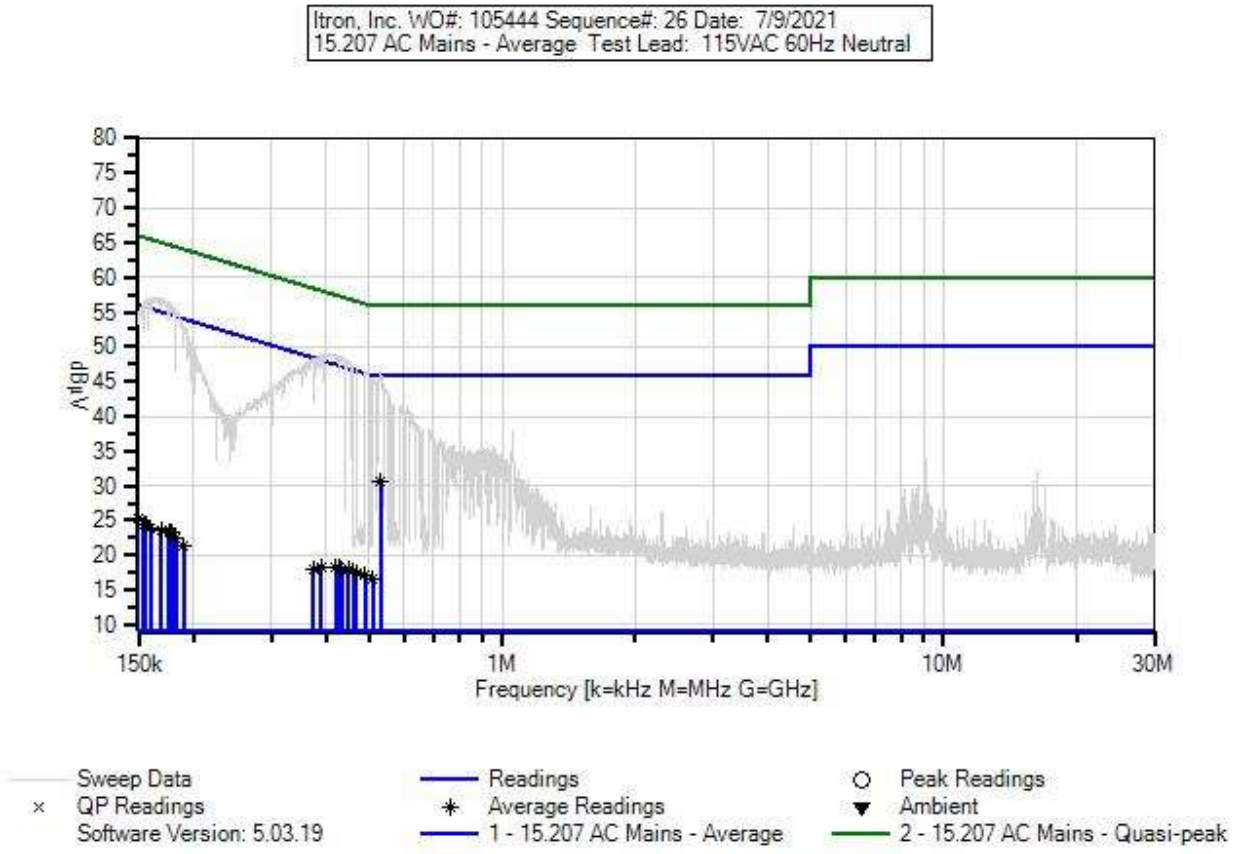
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to support tablet with USB cable. EUT is transmitting using test software on support tablet to control EUT. EUT is connected to a DC power supply which connects to AC mains.

High power and Low power ISM investigated, worst case reported. EUT has external attached antenna connected. Also investigated with vehicle antenna, data collected is representative of worst case.

Test Location: Bothell Lab C3
Test Method: ANSI C63.10 (2013)

Temperature (ºC): 22-24
Relative Humidity (%): 40-50



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
T5	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data: Reading listed by margin. Test Lead: Neutral

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	529.875k	20.7	+0.3	+0.0	+0.0	+9.1	+0.0	30.6	46.0	-15.4	Neutr
	Ave		+0.5								
^	529.874k	36.5	+0.3	+0.0	+0.0	+9.1	+0.0	46.4	46.0	+0.4	Neutr
			+0.5								
3	449.743k	8.1	+0.2	+0.0	+0.0	+9.1	+0.0	18.0	46.9	-28.9	Neutr
	Ave		+0.6								
^	449.743k	38.2	+0.2	+0.0	+0.0	+9.1	+0.0	48.1	46.9	+1.2	Neutr
			+0.6								
5	459.722k	7.9	+0.2	+0.0	+0.0	+9.1	+0.0	17.7	46.7	-29.0	Neutr
	Ave		+0.5								
^	459.721k	37.5	+0.2	+0.0	+0.0	+9.1	+0.0	47.3	46.7	+0.6	Neutr
			+0.5								
7	432.810k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	47.2	-29.1	Neutr
	Ave		+0.6								
8	428.717k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.3	-29.1	Neutr
	Ave		+0.5								
^	432.810k	38.7	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.2	+1.4	Neutr
			+0.6								
^	428.716k	38.8	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.3	+1.3	Neutr
			+0.5								
11	489.960k	7.2	+0.2	+0.0	+0.0	+9.1	+0.0	17.1	46.2	-29.1	Neutr
	Ave		+0.6								
^	489.960k	36.6	+0.2	+0.0	+0.0	+9.1	+0.0	46.5	46.2	+0.3	Neutr
			+0.6								
13	468.491k	7.6	+0.2	+0.0	+0.0	+9.1	+0.0	17.4	46.5	-29.1	Neutr
	Ave		+0.5								
^	468.491k	37.3	+0.2	+0.0	+0.0	+9.1	+0.0	47.1	46.5	+0.6	Neutr
			+0.5								
15	420.172k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.4	-29.1	Neutr
	Ave		+0.6								
^	420.172k	39.0	+0.2	+0.0	+0.0	+9.1	+0.0	48.9	47.4	+1.5	Neutr
			+0.6								
17	510.825k	6.8	+0.2	+0.0	+0.0	+9.1	+0.0	16.6	46.0	-29.4	Neutr
	Ave		+0.5								
^	510.824k	35.5	+0.2	+0.0	+0.0	+9.1	+0.0	45.3	46.0	-0.7	Neutr
			+0.5								
19	388.308k	8.5	+0.2	+0.0	+0.0	+9.1	+0.0	18.4	48.1	-29.7	Neutr
	Ave		+0.6								
^	388.307k	39.0	+0.2	+0.0	+0.0	+9.1	+0.0	48.9	48.1	+0.8	Neutr
			+0.6								
21	373.710k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	48.4	-30.3	Neutr
	Ave		+0.6								
^	373.710k	38.4	+0.2	+0.0	+0.0	+9.1	+0.0	48.3	48.4	-0.1	Neutr
			+0.6								
23	150.000k	11.6	+2.5	+0.0	+0.0	+9.1	+0.0	25.2	56.0	-30.8	Neutr
	Ave		+2.0								
24	176.304k	12.3	+0.4	+0.0	+0.0	+9.1	+0.0	23.4	54.7	-31.3	Neutr
	Ave		+1.6								

25 Ave	155.973k	12.6	+0.8 +1.9	+0.0	+0.0	+9.1	+0.0	24.4	55.7	-31.3	Neutr
26 Ave	179.029k	12.1	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	23.2	54.5	-31.3	Neutr
^	176.304k	45.4	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	56.5	54.7	+1.8	Neutr
28 Ave	168.864k	12.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	23.6	55.0	-31.4	Neutr
^	168.863k	46.0	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	57.1	55.0	+2.1	Neutr
30 Ave	154.192k	12.7	+0.8 +1.8	+0.0	+0.0	+9.1	+0.0	24.4	55.8	-31.4	Neutr
^	154.191k	44.4	+0.8 +1.8	+0.0	+0.0	+9.1	+0.0	56.1	55.8	+0.3	Neutr
^	150.000k	41.5	+2.5 +2.0	+0.0	+0.0	+9.1	+0.0	55.1	56.0	-0.9	Neutr
33 Ave	160.165k	12.5	+0.6 +1.8	+0.0	+0.0	+9.1	+0.0	24.0	55.5	-31.5	Neutr
^	160.165k	45.6	+0.6 +1.8	+0.0	+0.0	+9.1	+0.0	57.1	55.5	+1.6	Neutr
^	155.973k	45.2	+0.8 +1.9	+0.0	+0.0	+9.1	+0.0	57.0	55.7	+1.3	Neutr
36 Ave	182.802k	11.5	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.5	54.4	-31.9	Neutr
^	179.029k	45.0	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	56.1	54.5	+1.6	Neutr
^	182.801k	44.1	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	55.1	54.4	+0.7	Neutr
39 Ave	190.347k	10.5	+0.3 +1.4	+0.0	+0.0	+9.1	+0.0	21.3	54.0	-32.7	Neutr
^	190.347k	42.2	+0.3 +1.4	+0.0	+0.0	+9.1	+0.0	53.0	54.0	-1.0	Neutr

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.207 AC Mains - Quasi-peak**		
Work Order #:	**105444**	Date:	7/9/2021
Test Type:	**Conducted Emissions**	Time:	19:03:34
Tested By:	Michael Atkinson	Sequence#:	28
Software:	EMITest 5.03.19		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

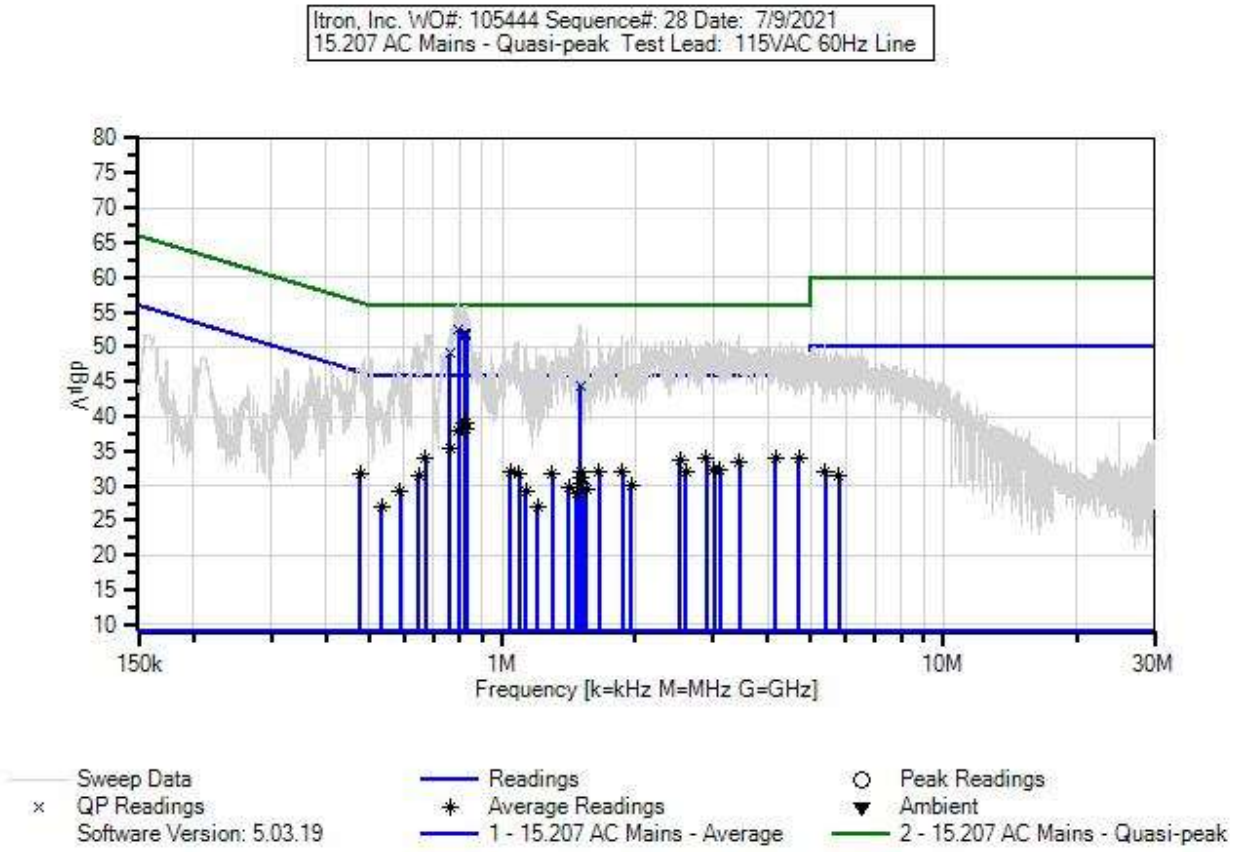
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to AC-USB adapter which is connected to AC mains. EUT is configured to transmit while connected to AC-USB adapter.

High power and Low power ISM investigated, worst case reported. EUT has internal antenna.

Test Location: Bothell Lab C3
Test Method: ANSI C63.10 (2013)

Temperature (ºC): 22-24
Relative Humidity (%): 40-50



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data: Reading listed by margin. Test Lead: Line

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	795.287k	42.7	+0.2	+0.0	+0.0	+9.1	+0.0	52.5	56.0	-3.5	Line
	QP		+0.5								
2	821.996k	42.4	+0.2	+0.0	+0.0	+9.1	+0.0	52.1	56.0	-3.9	Line
	QP		+0.4								
3	825.592k	42.3	+0.2	+0.0	+0.0	+9.1	+0.0	52.0	56.0	-4.0	Line
	QP		+0.4								
4	831.242k	42.1	+0.2	+0.0	+0.0	+9.1	+0.0	51.8	56.0	-4.2	Line
	QP		+0.4								
5	762.928k	39.4	+0.2	+0.0	+0.0	+9.1	+0.0	49.1	56.0	-6.9	Line
	QP		+0.4								
6	821.996k	29.3	+0.2	+0.0	+0.0	+9.1	+0.0	39.0	46.0	-7.0	Line
	Ave		+0.4								
7	825.592k	29.2	+0.2	+0.0	+0.0	+9.1	+0.0	38.9	46.0	-7.1	Line
	Ave		+0.4								
^	821.996k	46.3	+0.2	+0.0	+0.0	+9.1	+0.0	56.0	46.0	+10.0	Line
			+0.4								
^	825.591k	45.9	+0.2	+0.0	+0.0	+9.1	+0.0	55.6	46.0	+9.6	Line
			+0.4								
10	831.242k	28.5	+0.2	+0.0	+0.0	+9.1	+0.0	38.2	46.0	-7.8	Line
	Ave		+0.4								
^	831.241k	46.2	+0.2	+0.0	+0.0	+9.1	+0.0	55.9	46.0	+9.9	Line
			+0.4								
12	795.287k	28.2	+0.2	+0.0	+0.0	+9.1	+0.0	38.0	46.0	-8.0	Line
	Ave		+0.5								
^	795.286k	46.5	+0.2	+0.0	+0.0	+9.1	+0.0	56.3	46.0	+10.3	Line
			+0.5								
14	762.928k	25.7	+0.2	+0.0	+0.0	+9.1	+0.0	35.4	46.0	-10.6	Line
	Ave		+0.4								
^	762.927k	42.9	+0.2	+0.0	+0.0	+9.1	+0.0	52.6	46.0	+6.6	Line
			+0.4								
16	1.502M	34.6	+0.2	+0.0	+0.1	+9.1	+0.0	44.5	56.0	-11.5	Line
	QP		+0.5								
17	671.994k	24.2	+0.3	+0.0	+0.0	+9.1	+0.0	34.1	46.0	-11.9	Line
	Ave		+0.5								
18	2.898M	24.3	+0.1	+0.0	+0.1	+9.1	+0.0	34.1	46.0	-11.9	Line
	Ave		+0.5								
^	2.898M	41.1	+0.1	+0.0	+0.1	+9.1	+0.0	50.9	46.0	+4.9	Line
			+0.5								
20	4.696M	24.1	+0.1	+0.0	+0.1	+9.1	+0.0	34.0	46.0	-12.0	Line
	Ave		+0.6								
^	4.696M	40.8	+0.1	+0.0	+0.1	+9.1	+0.0	50.7	46.0	+4.7	Line
			+0.6								
22	672.110k	24.1	+0.3	+0.0	+0.0	+9.1	+0.0	34.0	46.0	-12.0	Line
	Ave		+0.5								
^	671.994k	42.0	+0.3	+0.0	+0.0	+9.1	+0.0	51.9	46.0	+5.9	Line
			+0.5								
^	672.110k	41.4	+0.3	+0.0	+0.0	+9.1	+0.0	51.3	46.0	+5.3	Line
			+0.5								

25 Ave	4.156M	24.2	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	34.0	46.0	-12.0	Line
^	4.156M	41.8	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
27 Ave	2.529M	23.9	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	33.7	46.0	-12.3	Line
^	2.529M	41.1	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	50.9	46.0	+4.9	Line
29 Ave	3.439M	23.6	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	33.4	46.0	-12.6	Line
^	3.439M	42.0	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
31 Ave	3.025M	22.7	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	32.4	46.0	-13.6	Line
^	3.025M	42.1	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
33 Ave	3.122M	22.5	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	32.3	46.0	-13.7	Line
^	3.122M	41.3	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	51.1	46.0	+5.1	Line
35 Ave	1.661M	22.3	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	32.1	46.0	-13.9	Line
^	1.661M	41.7	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	51.5	46.0	+5.5	Line
37 Ave	2.607M	22.4	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	32.1	46.0	-13.9	Line
^	2.607M	41.4	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	51.1	46.0	+5.1	Line
39 Ave	1.044M	22.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	32.0	46.0	-14.0	Line
^	1.044M	40.1	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	49.8	46.0	+3.8	Line
41 Ave	1.502M	22.1	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	32.0	46.0	-14.0	Line
42 Ave	1.871M	22.1	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	31.9	46.0	-14.1	Line
^	1.871M	41.8	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
44 Ave	1.300M	22.0	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	31.8	46.0	-14.2	Line
^	1.300M	39.8	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	49.6	46.0	+3.6	Line
46 Ave	1.091M	21.9	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	31.7	46.0	-14.3	Line
^	1.091M	39.8	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	49.6	46.0	+3.6	Line
48 Ave	647.190k	21.6	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	31.5	46.0	-14.5	Line
^	647.190k	41.3	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.2	46.0	+5.2	Line

50 Ave	1.510M	21.3	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	31.2	46.0	-14.8	Line
^	1.502M	43.2	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	53.1	46.0	+7.1	Line
52 Ave	476.320k	21.7	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	31.6	46.4	-14.8	Line
^	476.320k	39.4	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	49.3	46.4	+2.9	Line
54 Ave	1.513M	20.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.3	46.0	-15.7	Line
^	1.510M	42.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	52.3	46.0	+6.3	Line
^	1.513M	41.9	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
57 Ave	1.962M	20.1	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.0	46.0	-16.0	Line
^	1.962M	41.6	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	51.5	46.0	+5.5	Line
59 Ave	1.419M	20.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	29.7	46.0	-16.3	Line
^	1.419M	41.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Line
61 Ave	1.554M	19.8	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	29.6	46.0	-16.4	Line
^	1.554M	42.5	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	52.3	46.0	+6.3	Line
63 Ave	1.133M	19.3	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Line
^	1.133M	40.8	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	50.6	46.0	+4.6	Line
65 Ave	586.830k	19.2	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Line
^	586.830k	37.2	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	47.1	46.0	+1.1	Line
67 Ave	1.472M	19.1	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	28.8	46.0	-17.2	Line
^	1.472M	41.5	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.2	46.0	+5.2	Line
69 Ave	5.399M	22.2	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	32.1	50.0	-17.9	Line
^	5.399M	40.4	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	50.3	50.0	+0.3	Line

71	5.782M Ave	21.7	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	31.5	50.0	-18.5	Line
^	5.782M	40.1	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	49.9	50.0	-0.1	Line
73	532.660k Ave	17.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	27.0	46.0	-19.0	Line
^	532.660k	38.8	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	48.7	46.0	+2.7	Line
75	1.202M Ave	17.1	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	27.0	46.0	-19.0	Line
^	1.202M	41.7	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**105444**	Date:	7/9/2021
Test Type:	**Conducted Emissions**	Time:	18:44:44
Tested By:	Michael Atkinson	Sequence#:	27
Software:	EMITest 5.03.19		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

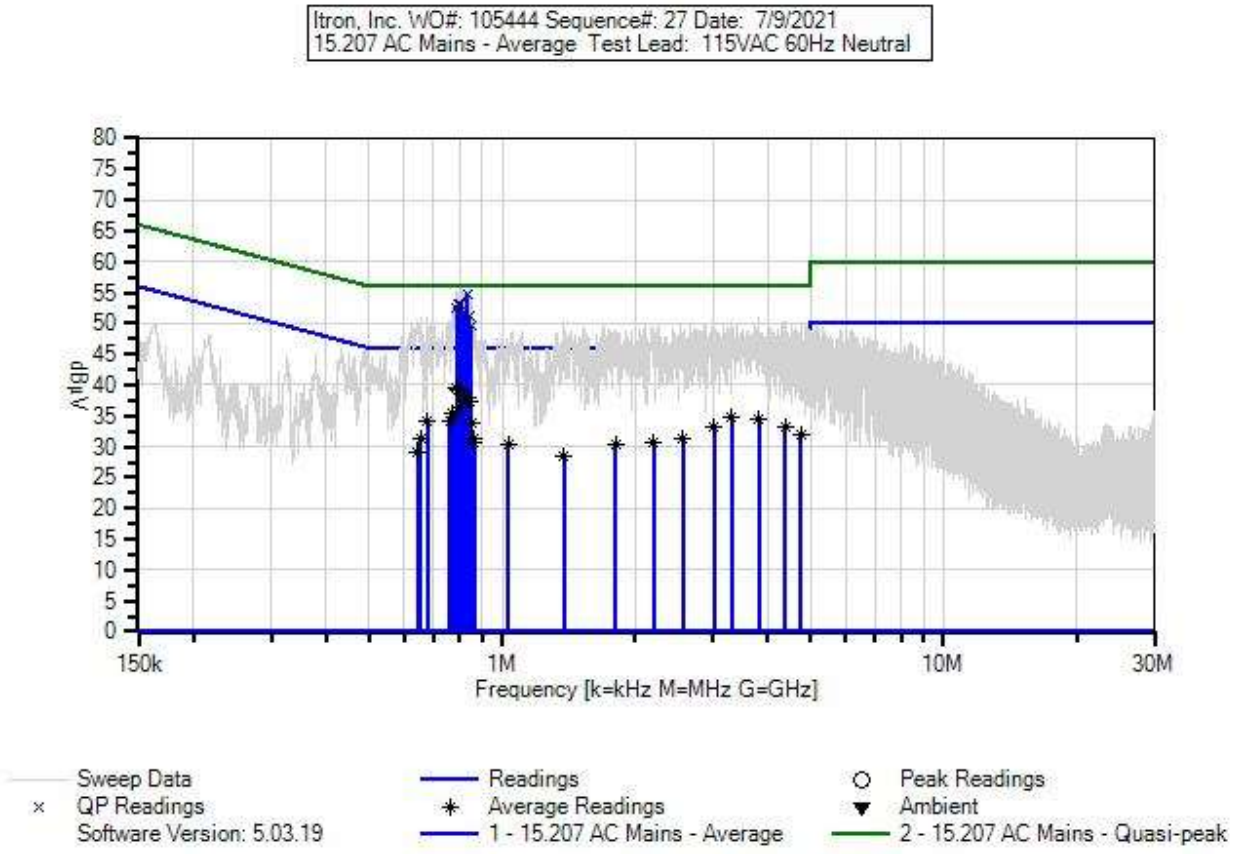
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to AC-USB adapter which is connected to AC mains. EUT is configured to transmit while connected to AC-USB adapter.

High power and Low power ISM investigated, worst case reported. EUT has internal antenna.

Test Location: Bothell Lab C3
Test Method: ANSI C63.10 (2013)

Temperature (ºC): 22-24
Relative Humidity (%): 40-50



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
T5	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data: Reading listed by margin. Test Lead: Neutral

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	836.378k	45.1	+0.2	+0.0	+0.0	+9.1	+0.0	54.8	56.0	-1.2	Neutr
	QP		+0.4								
2	805.560k	43.4	+0.2	+0.0	+0.0	+9.1	+0.0	53.1	56.0	-2.9	Neutr
	QP		+0.4								
3	794.260k	43.3	+0.2	+0.0	+0.0	+9.1	+0.0	53.0	56.0	-3.0	Neutr
	QP		+0.4								
4	790.664k	42.9	+0.2	+0.0	+0.0	+9.1	+0.0	52.6	56.0	-3.4	Neutr
	QP		+0.4								
5	821.996k	42.3	+0.2	+0.0	+0.0	+9.1	+0.0	52.0	56.0	-4.0	Neutr
	QP		+0.4								
6	843.569k	41.4	+0.2	+0.0	+0.0	+9.1	+0.0	51.1	56.0	-4.9	Neutr
	QP		+0.4								
7	851.274k	39.9	+0.2	+0.0	+0.0	+9.1	+0.0	49.6	56.0	-6.4	Neutr
	QP		+0.4								
8	790.664k	29.9	+0.2	+0.0	+0.0	+9.1	+0.0	39.6	46.0	-6.4	Neutr
	Ave		+0.4								
9	794.260k	29.6	+0.2	+0.0	+0.0	+9.1	+0.0	39.3	46.0	-6.7	Neutr
	Ave		+0.4								
^	790.664k	45.5	+0.2	+0.0	+0.0	+9.1	+0.0	55.2	46.0	+9.2	Neutr
			+0.4								
^	794.259k	44.5	+0.2	+0.0	+0.0	+9.1	+0.0	54.2	46.0	+8.2	Neutr
			+0.4								
12	836.378k	28.2	+0.2	+0.0	+0.0	+9.1	+0.0	37.9	46.0	-8.1	Neutr
	Ave		+0.4								
^	836.378k	45.8	+0.2	+0.0	+0.0	+9.1	+0.0	55.5	46.0	+9.5	Neutr
			+0.4								
14	821.996k	27.9	+0.2	+0.0	+0.0	+9.1	+0.0	37.6	46.0	-8.4	Neutr
	Ave		+0.4								
^	821.996k	44.9	+0.2	+0.0	+0.0	+9.1	+0.0	54.6	46.0	+8.6	Neutr
			+0.4								
16	843.569k	27.6	+0.2	+0.0	+0.0	+9.1	+0.0	37.3	46.0	-8.7	Neutr
	Ave		+0.4								
^	843.569k	45.8	+0.2	+0.0	+0.0	+9.1	+0.0	55.5	46.0	+9.5	Neutr
			+0.4								
18	805.560k	26.8	+0.2	+0.0	+0.0	+9.1	+0.0	36.5	46.0	-9.5	Neutr
	Ave		+0.4								
^	805.559k	46.2	+0.2	+0.0	+0.0	+9.1	+0.0	55.9	46.0	+9.9	Neutr
			+0.4								
20	773.714k	25.7	+0.2	+0.0	+0.0	+9.1	+0.0	35.5	46.0	-10.5	Neutr
	Ave		+0.5								
^	773.714k	42.7	+0.2	+0.0	+0.0	+9.1	+0.0	52.5	46.0	+6.5	Neutr
			+0.5								
22	3.311M	25.1	+0.1	+0.0	+0.1	+9.1	+0.0	34.8	46.0	-11.2	Neutr
	Ave		+0.4								
^	3.311M	40.8	+0.1	+0.0	+0.1	+9.1	+0.0	50.5	46.0	+4.5	Neutr
			+0.4								

24 Ave	3.810M	24.9	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	34.6	46.0	-11.4	Neutr
^	3.810M	41.3	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	51.0	46.0	+5.0	Neutr
26 Ave	678.042k	24.4	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	34.3	46.0	-11.7	Neutr
^	678.041k	41.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Neutr
28 Ave	759.846k	24.3	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	34.1	46.0	-11.9	Neutr
^	759.845k	40.6	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	50.4	46.0	+4.4	Neutr
30 Ave	851.274k	24.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	33.7	46.0	-12.3	Neutr
^	851.273k	44.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	53.7	46.0	+7.7	Neutr
32 Ave	4.369M	23.5	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	33.3	46.0	-12.7	Neutr
^	4.369M	40.5	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	50.3	46.0	+4.3	Neutr
34 Ave	3.019M	23.6	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	33.3	46.0	-12.7	Neutr
^	3.019M	41.0	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	50.7	46.0	+4.7	Neutr
36 Ave	4.751M	22.1	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	32.0	46.0	-14.0	Neutr
^	4.751M	40.4	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	50.3	46.0	+4.3	Neutr
38 Ave	653.851k	21.5	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	31.4	46.0	-14.6	Neutr
^	653.851k	41.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Neutr
40 Ave	2.573M	21.6	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	31.3	46.0	-14.7	Neutr
^	2.573M	40.0	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	49.7	46.0	+3.7	Neutr
42 Ave	859.492k	21.6	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	31.2	46.0	-14.8	Neutr
43 Ave	862.574k	21.2	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	30.8	46.0	-15.2	Neutr
^	859.491k	40.9	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	50.5	46.0	+4.5	Neutr
^	862.573k	40.7	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	50.3	46.0	+4.3	Neutr
46 Ave	2.201M	20.7	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.6	46.0	-15.4	Neutr
^	2.201M	38.6	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	48.5	46.0	+2.5	Neutr
48 Ave	1.033M	20.5	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	30.3	46.0	-15.7	Neutr
^	1.033M	39.4	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	49.2	46.0	+3.2	Neutr

50 Ave	1.803M	20.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.3	46.0	-15.7	Neutr
^	1.803M	39.9	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	49.8	46.0	+3.8	Neutr
52 Ave	642.361k	19.1	+0.3 +0.6	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Neutr
^	642.360k	40.3	+0.3 +0.6	+0.0	+0.0	+9.1	+0.0	50.3	46.0	+4.3	Neutr
54 Ave	1.380M	18.7	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	28.4	46.0	-17.6	Neutr
^	1.380M	40.7	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	50.4	46.0	+4.4	Neutr

Test Setup Photo(s)

Configuration 3

Configuration 9

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret (“^”) was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.